

ResultsPlus

Examiners' Report

June 2011

GCE Design and Technology: Product
Design 6GR02 01

Edexcel is one of the leading examining and awarding bodies in the UK and throughout the world. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers.

Through a network of UK and overseas offices, Edexcel's centres receive the support they need to help them deliver their education and training programmes to learners.

For further information, please call our GCE line on 0844 576 0025, our GCSE team on 0844 576 0027, or visit our website at www.edexcel.com.

If you have any subject specific questions about the content of this Examiners' Report that require the help of a subject specialist, you may find our **Ask The Expert** email service helpful.

Ask The Expert can be accessed online at the following link:
<http://www.edexcel.com/Aboutus/contact-us/>



Get more from your exam results

...and now your mock results too!

ResultsPlus is Edexcel's free online service giving instant and detailed analysis of your students' exam and mock performance, helping you to help them more effectively.

- See your students' scores for every exam question
- Spot topics, skills and types of question where they need to improve their learning
- Understand how your students' performance compares with Edexcel national averages
- Track progress against target grades and focus revision more effectively with NEW Mock Analysis

For more information on ResultsPlus, or to log in, visit www.edexcel.com/resultsplus.
To set up your ResultsPlus account, call 0844 576 0024

June 2011

Publications Code US027695

All the material in this publication is copyright
© Edexcel Ltd 2011

Introduction

The paper is 90 minutes in length and it seems that the majority of candidates use their time well. Most responses are well answered and there is little evidence of candidates having to rush answers due to insufficient time.

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 of Graphic Products.

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, some candidates still use additional pages. Centres should assist candidates during their exam preparation to write concisely. Examiners want to see that candidates know the material and can organise it effectively to answer the question set, rather than write as much as possible in the attempt that their response will gain some marks somewhere in the script.

Centres should be reminded that candidates responses are marked positively and candidates are rewarded for what they have written rather than penalised in any way.

The approach to individual questions is considered in the reports below. Examples of a candidate's response are given with some feedback for each question. Centres should use this material and past papers in order to assist candidates in their exam preparation. Use of the mark scheme, which is available on the Edexcel website, will also assist candidates in their understanding of questions and typical responses.

Finally, it goes without saying, candidates who read the question and respond with specifics, gain more marks than those who write "around" the subject with generic responses. This year the focus of the question is analysed in the material contained in this report in order to assist centres with understanding exam questions and to assist their candidates throughout their exam preparation.

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 is an "explain" question and therefore requiring 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.

The question focus is the reason for making architectural models. Responses should reflect this. It is useful to refer to the published mark scheme when looking at the examples to clearly see where marks are given.

(a) Explain **one** advantage of making an architectural model. (2)

You are able to see and correct any architectural mistakes made that could jeopardise the building whereas with a 1:1 scale building, correcting it would be extremely expensive.



ResultsPlus

Examiner Comments

This must be a justified answer, i.e. the point given must have a valid explanation. In this case both link BUT they are different points on the mark scheme, this is acceptable. The marks are awarded and you can use the MIX and MATCH technique.



ResultsPlus

Examiner Tip

Candidates should ensure they answer explain questions with a valid point and explain this point in order to gain full marks.

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

(a) Explain **one** advantage of making an architectural model. (2)

To show the views what the building will look like in a scaled model.



ResultsPlus

Examiner Comments

This must be a justified answer, i.e. the point given must have a valid explanation. In this case the candidate has only really given one point: i.e. it is a scaled model. It is true it will show views of the building but so can a drawing.



ResultsPlus

Examiner Tip

Candidates should ensure they answer explain questions with a valid point and explain this point in order to gain full marks.

Question 1 (b) (i)

This is a knowledge based "state" question, so a single word or single phrase would be acceptable. It is testing the candidates understanding and application of materials.

The question focus is the application of MDF and its use for the model base. The question clearly asks for the reason why MDF is used in this application. It is not just a general question of properties of MDF. Generic responses were not awarded marks.

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

(b) (i) The model base will be manufactured using MDF.
State **one** reason why MDF will be used for the base of the architectural model. (1)

~~Design is easy to apply~~ Designs can be easily applied such as paints, photographs etc, even 3D materials such as fake grass, or sand with PVA.

(ii) Jelutong will be used to make the building.



ResultsPlus

Examiner Comments

This candidate gave a good response; explaining that MDF is a good material for modelling due to its ability to accept finishes and therefore achieved full marks.



ResultsPlus

Examiner Tip

Ensure candidates use specific information not just general comments of "strong" and "cheap" etc.

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

(b) (i) The model base will be manufactured using MDF.
State **one** reason why MDF will be used for the base of the architectural model. (1)

it is relatively inexpensive.



ResultsPlus

Examiner Comments

This candidate gave a poor response; whilst it is true that MDF is relatively inexpensive, it is the application of MDF that is asked for here. If the candidate had mentioned that it is inexpensive in comparison to 'natural' materials marks would be awarded.



ResultsPlus

Examiner Tip

It is far better to respond with specific factual knowledge rather than general comments.

Question 1 (b) (ii)

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 candidates understanding of properties of materials.

The question focus here is understanding the difference types of properties: mechanical and functional. It is expected that students will be able to tell the difference between these types of properties. Generic responses were not awarded marks. Equally it is expected candidates know the difference between mechanical and functional categories of properties.

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

(ii) Jelutong will be used to make the building.

Give **one** mechanical property and **one** functional property of Jelutong. (2)

Mechanical property

is a lightweight material

Functional property

is an easy material to work with due to its low density so can be placed on other materials without a problem.



ResultsPlus Examiner Comments

This candidate gave a good response and gained 2 marks. The responses correctly identified mechanical and functional properties and listed them in the correct spaces.



ResultsPlus Examiner Tip

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

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

(ii) Jelutong will be used to make the building.
Give **one** mechanical property and **one** functional property of Jelutong. (2)

Mechanical property
Can be cut easily.

Functional property
It is light weight.



ResultsPlus
Examiner Comments

This candidate gave a poor response and gained 0 marks whilst the responses were correct, they were in the wrong sections so were awarded no marks, i.e. mechanically it is lightweight and functionally it can be cut easily.



ResultsPlus
Examiner Tip

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

Question 1 (c)

This is a knowledge based "state" question, so a single word or single phrase would be acceptable. It is testing the candidates understanding of the application of PVA adhesive.

The question focus here is general understanding of the advantages and disadvantages of PVA.

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

(c) PVA adhesive will be used during the construction of the model.

State **one** advantage and **one** disadvantage of PVA adhesive. (2)

Advantage
Strong hold when set if used with correct materials.

Disadvantage
Can take time to set, and any movement during this time may reduce the ^{adhesive} ~~strong~~ property.



ResultsPlus Examiner Comments

This candidate gave a good response and was awarded 2 marks. The candidate answered with clear and concise responses.



ResultsPlus Examiner Tip

In preparation for the exam; ensure candidates do not just use the phrases "strong" and "cheap". But use these in sentences to justify what they mean. For example here we can see the phrase "strong hold when set if used with correct materials".

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

(c) PVA adhesive will be used during the construction of the model.

State **one** advantage and **one** disadvantage of PVA adhesive.

(2)

Advantage

PVA glue dries clear so it will not be messy if smudged or split.

Disadvantage

It is not the strongest type of adhesive for gluing wood together with wood



ResultsPlus

Examiner Comments

This candidate gave an unsuccessful response and was awarded 0 marks. For the advantage response; whilst it does dry clear it is good practice to clear up smudges and spillages so it is not clear how this is an advantage. In this application drying clear, whilst correct, has no real relevance.



ResultsPlus

Examiner Tip

Ensure candidates are clear on the types of adhesives and applications.

Question 1 (d)

Questions at AS level that involve "completing the table" often require short phrase responses.

The question focus here is risk assessments that would be undertaken in the school based workshop during prototype manufacture. Most candidates should be familiar with scroll saws and the risk assessments related to their use.

This question requires the RISK and both CONTROLS to be linked.

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

(d) The scroll saw in Figure 2 below was used to cut the Jelutong pieces for the model.

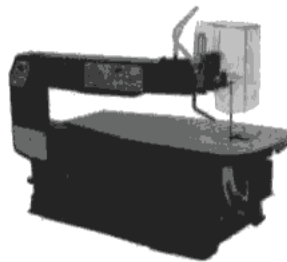


Figure 2

Complete the risk assessment table below.

Hazard	Risk	People at risk	Control
Using the scroll saw	Cutting hand on saw (1)	User	hold Jelutong with fingers as far away from saw as possible (1)
			we cutting shield to ensure no unnecessary Contact (1)



ResultsPlus Examiner Comments

This candidate gave a good response and was awarded 3 marks. The candidate answered with clear and concise short statement responses.

The risk and control were linked and the two controls were different showing wide knowledge of the subject area.



ResultsPlus Examiner Tip

When answering this type of question, do not use two PPE (personal protective equipment) controls. During exam preparation ensure candidates focus on risk assessments for a range of equipment and processes used during workshop model making.

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

(d) The scroll saw in Figure 2 below was used to cut the Jelutong pieces for the model.

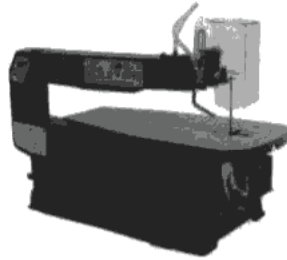


Figure 2

Complete the risk assessment table below.

Hazard	Risk	People at risk	Control
Using the scroll saw	Bits of material flying out while cutting or the sawing	User	Wear safety goggles. goggles. (1)
			Wear a lab coat. (1)



ResultsPlus

Examiner Comments

This candidate gave a sound response and was awarded 2 marks. The candidate answered with clear and concise short statement responses.

However, the risk and one control were linked (i.e. the flying metal and goggles) but the second control was a repeat PPE and it is unclear how wearing a lab coat is a second 'different' control.



ResultsPlus

Examiner Tip


Candidates should try and the examiner they have a 'broad' knowledge of the subject. During exam preparation candidates should focus on risk assessments for a range of equipment and processes used in model making.

Question 1 (e) (i)

This is a knowledge based question. Questions at AS that involve "complete the table" often require short phrases as answers.

The question focus is safety signs found in schools: in this case: First Aid. 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.

Sign	Meaning
	<p>First aid - where the first aid kit is kept. [would most likely be green with white cross] (1)</p>



ResultsPlus Examiner Comments

Descriptions are not needed with this type of question, in this case the candidate has given a description.


This response gained full marks.



ResultsPlus Examiner Tip

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

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

Sign	Meaning
	<p>first aid kit (1)</p>



ResultsPlus Examiner Comments

Descriptions are not needed with this type of question. In this case the student has given a straight forward definition.

This response gained full marks



ResultsPlus Examiner Tip

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

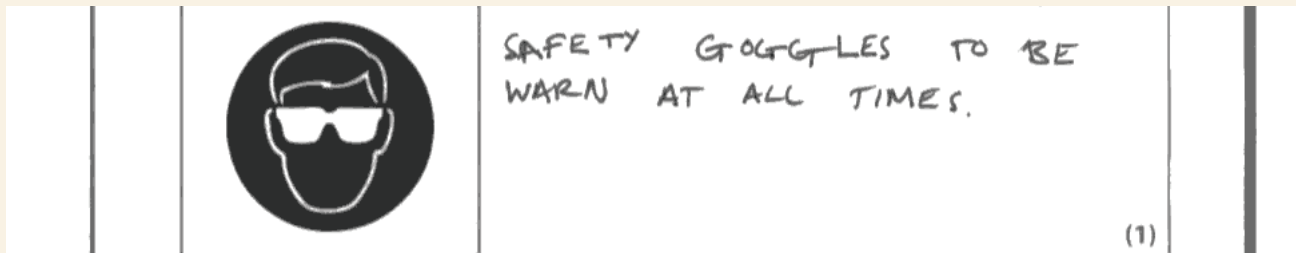
Question 1 (e) (ii)

This is a knowledge based question. Questions at AS that involve "complete the table" often require short phrases.

The question focus is safety signs found in schools: in this case: Wear Safety Goggles.

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.



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 and suitable for the type of question, a description is not needed. This response gained full marks.



ResultsPlus Examiner Tip

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


Question 1 (e) (iii)

This is a knowledge based question. Questions at AS that involve "complete the table" often require short phrases.

The question focus is safety signs found in schools: in this case: Fire extinguisher.

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.

	fire extinguisher	(1)
---	-------------------	-----



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 and suitable for the type of question, a description is not needed.

This response gained full marks.



ResultsPlus

Examiner Tip

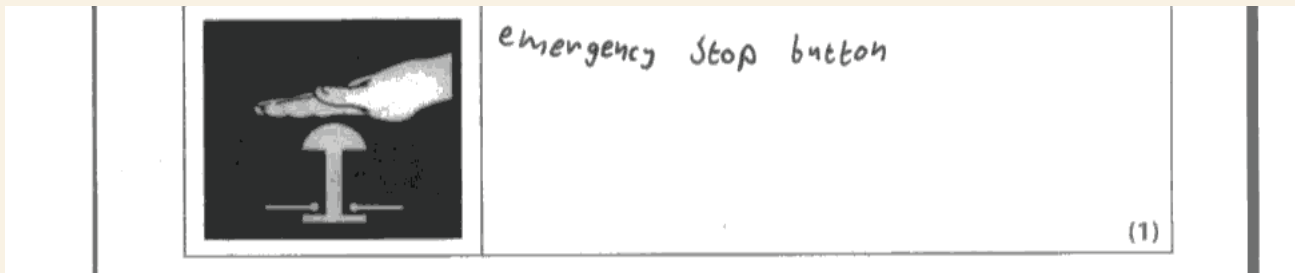
The exam paper is printed in black and white, so practice safety sign recognition in black and white.

Question 1 (e) (iv)

This is a knowledge based question. Questions at AS that involve "complete the table" questions often require short phrases.

The question focus is safety signs found in schools: in this case: Emergency Stop Button. 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.



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 and suitable for the type of question, a description is not needed.

This response gained full marks.



ResultsPlus Examiner Tip

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

Question 2 (a)

This question allows candidates to show their drawing skills whilst in an exam situation. Whilst the question asks for a "sketch", candidates should endeavour to draw as neatly as possible. In addition, they should ensure they have included all aspects of the drawing required from the question. Candidates need to practice drawing for AS exams.

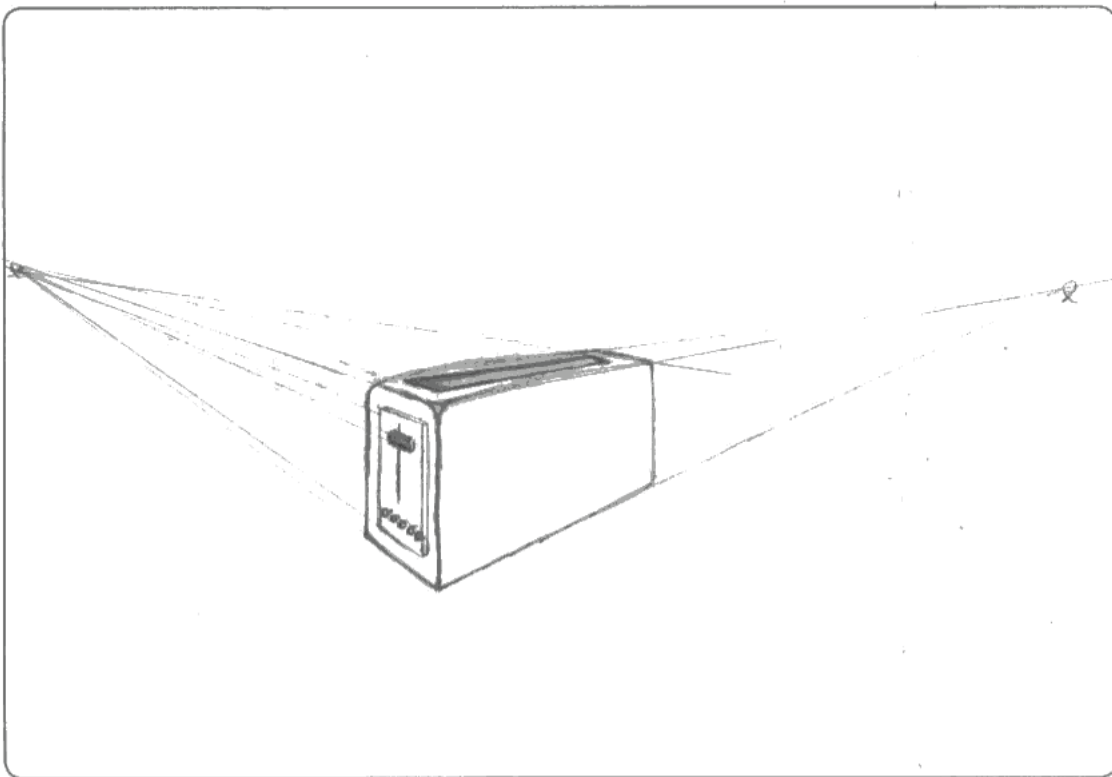
The question focus in this drawing question is: 2 point perspective. Therefore it does require a specific drawing using this technique. Candidates that drew in any other pictorial method were not awarded marks.

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

(a) In the space below, draw a two point perspective pictorial drawing of the toaster shown in Figure 3.

Your sketch should clearly show the toaster and the perspective construction lines.

(5)



ResultsPlus Examiner Comments

This 2 point perspective is well answered and gains full marks, it clearly shows the construction lines and all essential details. The proportion of the toaster is maintained and there is clarity of drawing along with rounded corners, end panel and top slot.



ResultsPlus Examiner Tip

Candidates should ensure their drawing is clear and well lined in; use an HB pencil only.

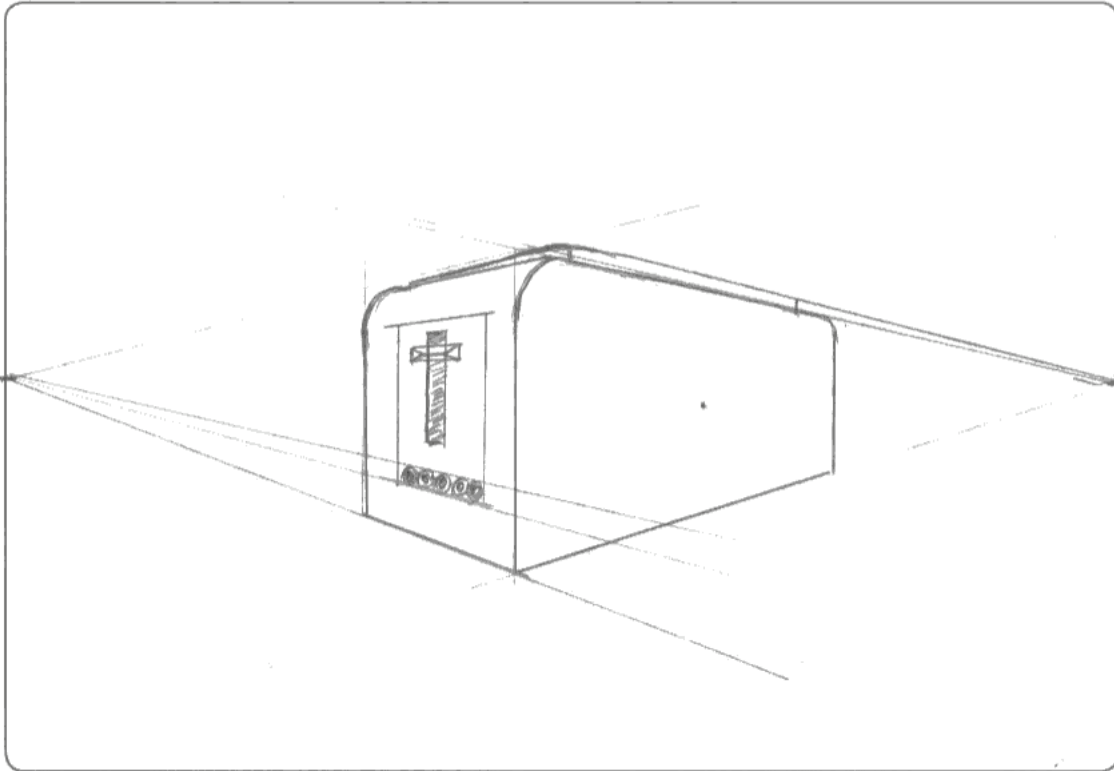
Candidates should not use colour or faint pencil lines.

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

(a) In the space below, draw a two point perspective pictorial drawing of the toaster shown in Figure 3.

Your sketch should clearly show the toaster and the perspective construction lines.

(5)



ResultsPlus
Examiner Comments

This 2 point perspective is well answered and gains full marks, it is clearly shows the construction lines and all essential details. The proportion of the toaster is maintained and there is clarity of drawing along with rounded corners, end panel and top slot.



ResultsPlus
Examiner Tip

Candidates should ensure their drawing is clear and well lined in; use an HB pencil only.

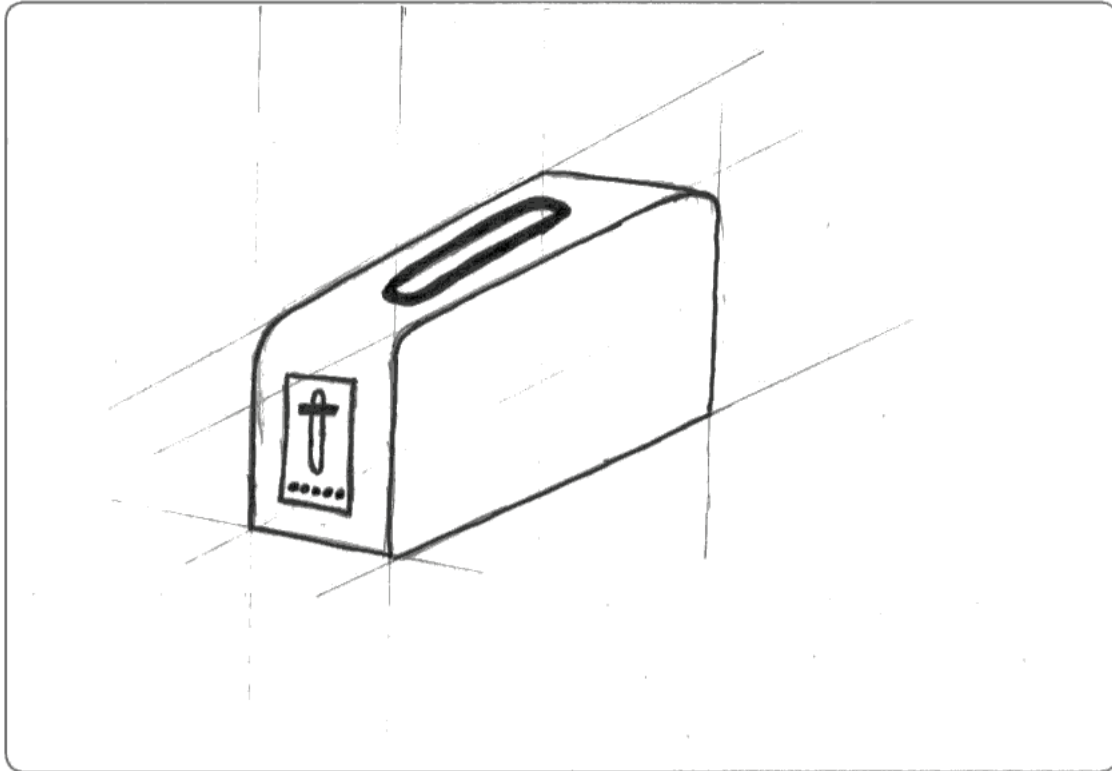
Candidates should not use colour or faint pencil lines.

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

(a) In the space below, draw a two point perspective pictorial drawing of the toaster shown in Figure 3.

Your sketch should clearly show the toaster and the perspective construction lines.

(5)



ResultsPlus
Examiner Comments

In this case the candidate has correctly drawn a pictorial (isometric style) response. However it is not 2 point perspective as the question clearly asks for and so gains no marks.



ResultsPlus
Examiner Tip

Candidates should ensure they prepare and understand all drawing styles listed in the specification.

Question 2 (b)

This is a knowledge based question. The question focus in this case is the 'name' of a specific polymer.

Single word or short phrase answers are acceptable for this type of question.

This is a commonly used polymer and so centres are advised to ensure candidates are aware of these basic materials used within Graphic Products.

The candidate has clearly written the polymer type: high density polyethylene.

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

(b) Figure 4 shows the symbol found on the toaster case.




Figure 4

State the specific polymer that HDPE represents. (1)

High density polyethylene



ResultsPlus

Examiner Comments

Descriptions are not needed. Marks are awarded for phonetically correct responses.



ResultsPlus

Examiner Tip

Candidates should try to learn the correct spellings of polymers.

Question 2 (c)

This being a "give" question that asks for advantages and disadvantages, responses would benefit from being sentences to really ensure marks are gained.

The question focus in this case is asking for advantages and disadvantages of the screen printing process. Screen printing is a process that can be achieved at most levels of production from one off (in school) to fully automated mass produced systems.

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

(c) Screen-printed decorative patterns will be applied to the side panel of the toaster shown in Figure 3.

(i) Give **two** advantages of the screen printing process. (2)

1 It can be produced in small batches quickly.

2 It is not a particularly expensive process because the screens are washed ^{and} used again.

(ii) Give **one** disadvantage of the screen printing process. (1)

It cannot produce prints with fine detail.



ResultsPlus

Examiner Comments

This is a sound answer, gaining 1 advantage mark and 1 disadvantage mark. The advantage mark was awarded for the "expensive process". Whilst it is true screen printing can be used for batches, it is also true for other production levels. So in this case the candidate should have stated "suitable for a range of production levels". The disadvantage was clear and concise.



ResultsPlus

Examiner Tip

Candidates should not fall into the trap of stating a production method is suitable of one level of production when it can be used for a range.

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

(c) Screen-printed decorative patterns will be applied to the side panel of the toaster shown in Figure 3.

(i) Give **two** advantages of the screen printing process. (2)

1 The objects or letters ~~which~~ which have been screen printed onto the toaster will not be easily peeled or scratched off/damaged.

2 Relatively cheap.

(ii) Give **one** disadvantage of the screen printing process. (1)

~~it~~ Doesn't last long.



ResultsPlus
Examiner Comments

This is a poor answer, gaining 0 advantage marks and 0 disadvantage marks. The candidate here has only offered short generic responses that could be related to any process. The response of "relatively cheap" is not justified in any way so attained no marks.



ResultsPlus
Examiner Tip

Candidates should prepare for the exam by listing detailed advantages and disadvantages for a range of processes.

Question 2 (d)

This is an "explain" question so the response should be full detailed sentences; in this case three separate points are needed for full marks.

The question focus here asks candidates to explain why rapid prototyping is used. It is not asking for a general "what" is rapid prototyping! Candidates who answered with "what" is rapid prototyping attained no marks.

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

(d) Explain why rapid prototyping was used at the development stage in the production of the concept toaster.

(3)

It was used because it shows how it will look in 3D and you can make changes, more easily. It will be a more rapid process than doing it the traditional way. It will be easy to see see it in real life and not on the computer and it is quicker than putting a model together and more effective than drawing it.



ResultsPlus

Examiner Comments

A strong response gaining 3 marks. The candidate gives three points in a detailed and concise way.



ResultsPlus

Examiner Tip

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

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

(d) Explain why rapid prototyping was used at the development stage in the production of the concept toaster.

*accurate cost model
and handle size*

(3)

Rapid prototyping allowed the toaster to be used and handled as a model, testing the use/performance of it. It also produces an accurate scale of the size of the actual toaster, allowing modifications and adjustments to be made.



ResultsPlus

Examiner Comments

A strong response, gaining 3 marks. The candidate gives three points in a detailed and concise way.



ResultsPlus

Examiner Tip

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

Question 2 (e)

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

The question focus here asks candidates to outline how computer aided inspection can be used. It is not a question about "what" CAI is or "write all you know about CAI". Responses that focused just on what CAI is gained no marks. In addition, the candidate must reference CAI during the printing process.

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

(e) Computer aided inspection is frequently used in total quality management (TQM) systems.

Outline how computer aided inspection can be used to ensure a high degree of accuracy in the printing process. (2)

A densometer can read the density on the colour bar and then depending on the density adds more ink or stops adding it for a bit.



ResultsPlus

Examiner Comments

This is a good answer, gaining 2 marks. The candidate refers to the printing process and how CAI is used.



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.

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

(e) Computer aided inspection is frequently used in total quality management (TQM) systems.

Outline how computer aided inspection can be used to ensure a high degree of accuracy in the printing process.

(2)

The computer aided inspections are a lot more accurate than manual inspections with measurement etc. Therefore the products because ^{by} manual mistakes can be make but computer aided that ~~does~~ avoids mistakes.

(Total for Question 2 = 14 marks)



ResultsPlus Examiner Comments

An unsuccessful response; the candidate gained 0 marks. The candidate seemed to be referring to CAI in general rather than how CAI is used in printing.



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.

Question 3 (a)

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 so candidates have the opportunity to gain marks.

It is essential that candidates have knowledge of industrial manufacturing processes.

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

(a) The cyclist's crash helmet is manufactured using injection moulding.
Using annotated sketches describe the injection moulding process. (4)

liquid plastic accumulates at the end of the screw, where the hydrolics push the screw to force the plastic into the mould

heaters to melt the plastic

plastic granules fed into hopper

Hydraulic Motor

drill/screw

mould

As the plastic granules move along the screw, they are melted by the heaters and turned into liquid plastic and quickly injected into the mould where it is quickly cooled and ejected



ResultsPlus

Examiner Comments

A strong response gaining full marks. It is clear, concise and detailed. Annotations are clear and detailed.



ResultsPlus

Examiner Tip

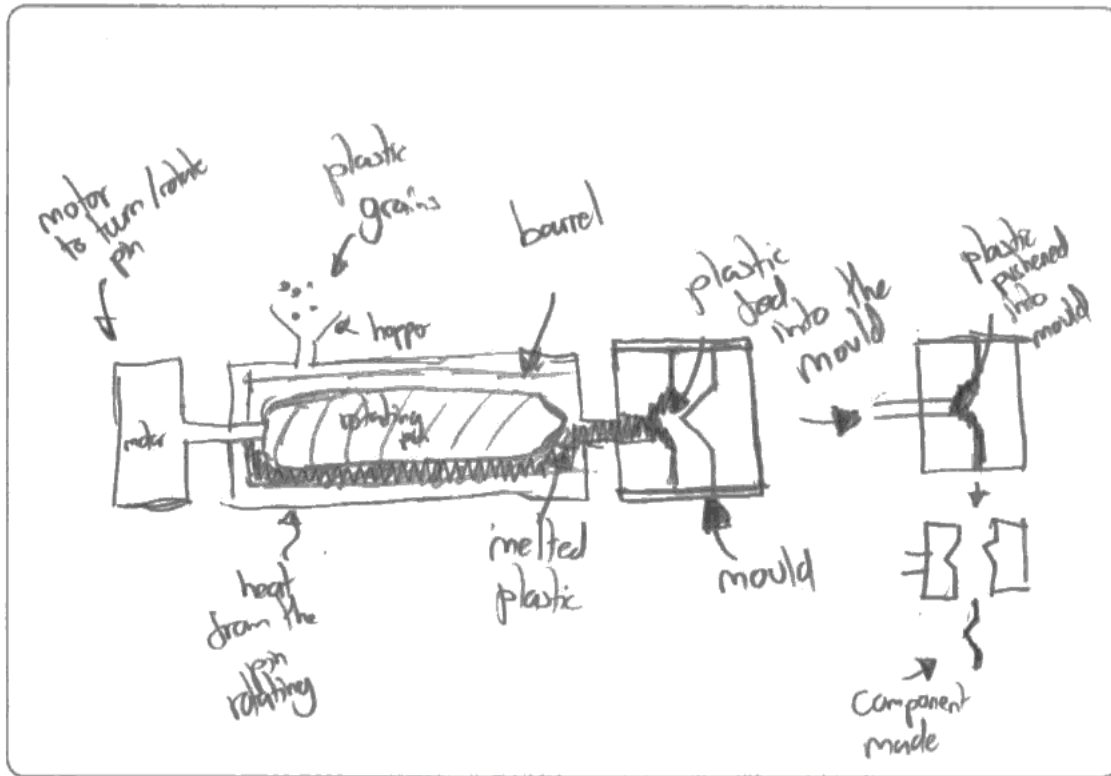
Candidates should draw detailed annotated sketches and ensure they use all the space available.

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

(a) The cyclist's crash helmet is manufactured using injection moulding.

Using annotated sketches describe the injection moulding process.

(4)



ResultsPlus

Examiner Comments

A strong response gaining full marks. It is clear concise and detailed. Annotations are clear.



ResultsPlus

Examiner Tip

Candidates should draw detailed annotated sketches and ensure they use all the space available.

Question 3 (b)

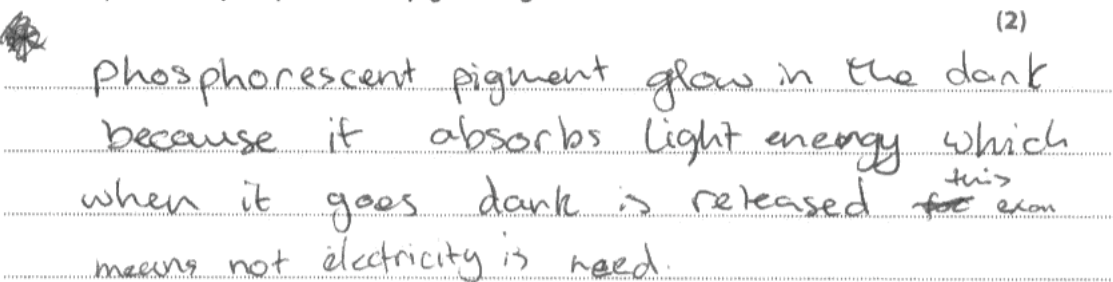
This "explain" question requires a response in full detailed sentences and detailed; in this case two separate points are needed for full marks.

The question focus here asks candidates to explain how phosphorescent pigments glow. The response requires a statement of how light energy is absorbed and a statement of how the light is released.

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

(b) Safety stripes are added to the cyclist's crash helmet using phosphorescent pigments.

Explain how phosphorescent pigments glow in the dark. (2)





ResultsPlus

Examiner Comments

A clear concise response, gaining 2 marks.



ResultsPlus

Examiner Tip

Candidates should ensure they know all Smart materials, and more importantly the similarities and differences between them.

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

(b) Safety stripes are added to the cyclist's crash helmet using phosphorescent pigments.

Explain how phosphorescent pigments glow in the dark.

(2)

Phosphorescent pigments reflect light, so when the head lights of a car hit the bikers helmet they will reflect back and warn the driver of the bikers presence.



ResultsPlus

Examiner Comments

This candidate has 'mixed up' phosphorescent pigments with reflective material and therefore gains 0 marks.



ResultsPlus

Examiner Tip

Candidates should ensure they know all Smart materials and more importantly the similarities and differences between them.

Question 3 (c)

This is an "outline" question needing a paragraph answer. In this case four separate points are needed for full marks. Sentences and detailed description are required.

The focus of the question is the description of glass reinforcement process and not what is GRP. It is essential candidates understand a wide range of manufacturing processes used in the production of products.

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

(c) A glass reinforced plastic (GRP) cyclist's crash helmet is also available.

*glass coat
2 matting
resin etc.*

Outline the stages in the manufacturing process for the production of the glass reinforced plastic (GRP) cyclist's crash helmet.

(4)

For the outside of the helmet, a glossy coat/gel is applied to a mould so the appearance is shiny and high quality. Secondly, a matting of the glass reinforced plastic is placed into the mould and pressed out. Resin is then coated on top of the matting and left to set. Lots of layers of the matting and resin are applied until the helmet is at a suitable strength.



ResultsPlus

Examiner Comments

A strong answer and the candidate gained full marks. The response gives four points in clear, detailed and concise sentences. The candidate has a clear understanding of the process.



ResultsPlus

Examiner Tip

Candidates should understand a wide range of manufacturing processes. Use the process to structure responses: in this case, polished mould, gel coat for colour, glass matting layered with resin, use of roller to remove air. Candidates should not confuse the GRP process with the Carbon Fibre process.

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

(c) A glass reinforced plastic (GRP) cyclist's crash helmet is also available.

Outline the stages in the manufacturing process for the production of the glass reinforced plastic (GRP) cyclist's crash helmet.

(4)

The mould is made from a metal. It is then greased with a ~~non~~ non-slick grease. The sheets of GRP are layered onto the surface and painted on with a fur or resin like glue and reach with the fiber to harden. Many layers are done till it is thick enough to be ~~with safe~~. It is then left to dry and set. Once it has set it can be pulled easily from the mould. The fibres may be rough so the outside may need to be sanded, buffed, and then polished. Special ~~adhesive~~ paints can be used for better aesthetics.



ResultsPlus

Examiner Comments

Strong response gaining 4 marks. The candidate gives the whole process in order; more than 4 awardable points given.



ResultsPlus

Examiner Tip

Candidates should understand a wide range of manufacturing processes. Use the process to structure responses: in this case, polished mould, gel coat for colour, glass matting layered with resin, use of roller to remove air. Candidates should not confuse the GRP process with the carbon fibre process.

Question 3 (d)

This is an "outline" question requiring a single paragraph answer, with two single points. Candidates must choose a type of testing to respond to.

The focus of the question is the key features of testing not a general description of what testing is.

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

(d) The cyclist's crash helmet undergoes testing before being sold to the public using the following methods:

- testing to destruction
- non-destructive testing

Outline the key features of **one** of these methods of testing.

(2)

Chosen testing method: non-destructive testing

The product is tested ~~can~~ in different situations ~~until~~ until it shows signs of destruction i.e. cracks or breakings where data is recorded through out to observe or test the maximum level.



ResultsPlus

Examiner Comments

This is a good answer, gaining 2 marks. The candidate refers to testing in different situations and data is being recorded.



ResultsPlus

Examiner Tip

Testing is an essential part of production. Good exam preparation should allow the candidates to become familiar with the whole range of production manufacture; from design/CAD through to testing.

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

(d) The cyclist's crash helmet undergoes testing before being sold to the public using the following methods:

- testing to destruction
- non-destructive testing

Outline the key features of **one** of these methods of testing.

(2)

Chosen testing method: *testing to destruction.*

within this method the helmet is placed under a machine which deals heavy pressure down on to the helmet, proving its resilience to breaking as well as to how much force is needed for it to crack.



ResultsPlus

Examiner Comments

a good answer, gaining 2 marks. The candidate refers to testing in a machine and how this provides data on the amount of force needed to break the product.



ResultsPlus

Examiner Tip

Testing is an essential part of production. Good exam preparation should allow students to become familiar with the whole range of production; from design/CAD to testing.

Question 3 (e)

This is an "explain" question. The response should be full sentences and be detailed; in this case two separate points are needed for full marks.

The question focus here asks candidates to explain why expanded polystyrene is used and not what expanded polystyrene is.

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

(e) The cyclist's crash helmet is packaged in a protective box with expanded polystyrene inserts.

Explain why expanded polystyrene is used in this situation.

(2)

It is ~~also~~ a relatively cheap and economical material, it could be cut into the exact shape to hold the helmet, it also absorbs external shocks, protecting the helmet from being damaged in the box.



ResultsPlus Examiner Comments

This is a good answer, gaining 2 marks. The candidate refers to the economical nature of the material and the energy absorbing aspect of the material.



ResultsPlus Examiner Tip

Candidates should be aware of a range of packaging techniques; for example polystyrene, bubble packs, eco-packs, sustainable packaging etc.

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

(e) The cyclist's crash helmet is packaged in a protective box with expanded polystyrene inserts.

Explain why expanded polystyrene is used in this situation.

(2)

expanded polystyrene is used in this situation to protect the hat from getting damaged. polystyrene is light ~~so~~ soft so it will not damage the hat itself, it will act as a protective layer.



ResultsPlus Examiner Comments

This is a good answer, gaining 2 marks. The candidate refers to the lightweight nature of the material and the energy absorbing aspect of the material.



ResultsPlus Examiner Tip

Candidates should be aware of a whole range of packaging techniques; for example polystyrene, bubble packs, eco-packs, sustainable packaging.

Question 4 (a)

"Outline" questions need a paragraph answer. In this case three separate points are needed for full marks. Sentences and detailed descriptions are required. The focus is a straight forward listing of advantages and disadvantages for case-bound (hard bound) books.

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

(a) Outline **two** advantages and **one** disadvantage of case-bound books.

(3)

Case bound books are stronger and ~~to~~ therefore last longer than paper backs. They ~~do~~ also help keep the books shape and protect the ~~to~~ pages from bending. A disadvantage however is that case-bound books are heavier than paper backs which ~~will~~ could make them inconvenient to the user.



ResultsPlus Examiner Comments

This candidate gives a detailed response and achieves full marks; explanations of case-bound books lasting longer, protecting pages and are heavier give a clear well structured response.



ResultsPlus Examiner Tip

Candidates should have experience of a range of binding techniques that are used with graphic products.

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

(a) Outline **two** advantages and **one** disadvantage of case-bound books.

(3)

Case bound books will last longer, because of the tough material. They are mass produced so production is quick. Sometimes pages can fall out of the book if not glued in properly. The book is strong and can brake not as quickly as a paper book.



ResultsPlus

Examiner Comments

This response starts with a clear statement of case-bound books last longer, but becomes confused with perfect bound books. So only 1 mark awarded.



ResultsPlus

Examiner Tip

Candidates should prepare for exams by becoming familiar with a range of binding techniques.

Question 4 (b)

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

The focus of the question is the properties of commercial bond paper.

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

(b) The pages of the book are made of commercial bond paper.

State **two** properties that make commercial bond paper suitable for case-bound books. (2)

- 1 The paper is easy to print on and doesn't run or smudge/blur.
- 2 The paper is relatively thin allowing a large quantity of pages in any given book.



ResultsPlus

Examiner Comments

This candidate responds with too many generalisations and therefore attains 0 marks.



ResultsPlus

Examiner Tip

Candidates should ensure they prepare for exams by focusing on specific properties for materials not generalisations.

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

(b) The pages of the book are made of commercial bond paper.

State **two** properties that make commercial bond paper suitable for case-bound books.

(2)

- 1 They have a high gsm, therefore making the pages less prone to tearing away as it is a thicker material.
- 2 Commercial bond paper is normally used in high quality produced books, so therefore it makes a good choice with case bound books as the two complement each other.



ResultsPlus

Examiner Comments

This candidate achieved full marks.
They respond with specific information.



ResultsPlus

Examiner Tip

Candidates should ensure they prepare for exams by gathering specific information rather than generalisations.

Question 4 (c)

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 so candidates have the opportunity to gain marks.

It is essential that candidates have knowledge of industrial manufacturing processes.

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

(c) The cover is embossed with a pattern to add aesthetic appeal.

Using annotated sketches describe the embossing process. (4)

Top ~~plate~~ ^{plate} has a raised section.

Bottom ~~plate~~ ^{plate} has a lowered section.

(1)

(2) ~~Paper plates~~ The material that you wish to emboss is placed in between the two plates.

(3) The plates are then pressed together and the raised section fits into the lowered section (forcing the material down with it).

(4) The plates are then separated and the material has been embossed.

The material that was placed between the two plates.

The raised plate is reversed so that ~~it~~ ^{the material} is the correct way round when the material is taken out at the end.



ResultsPlus

Examiner Comments

This response is clear and detailed. The annotation supports the sketches. The sketches are easily understandable. This achieved full marks. Note: the whole space is used, and this ensures the sketches and annotations are clear for the examiner to see.



ResultsPlus

Examiner Tip

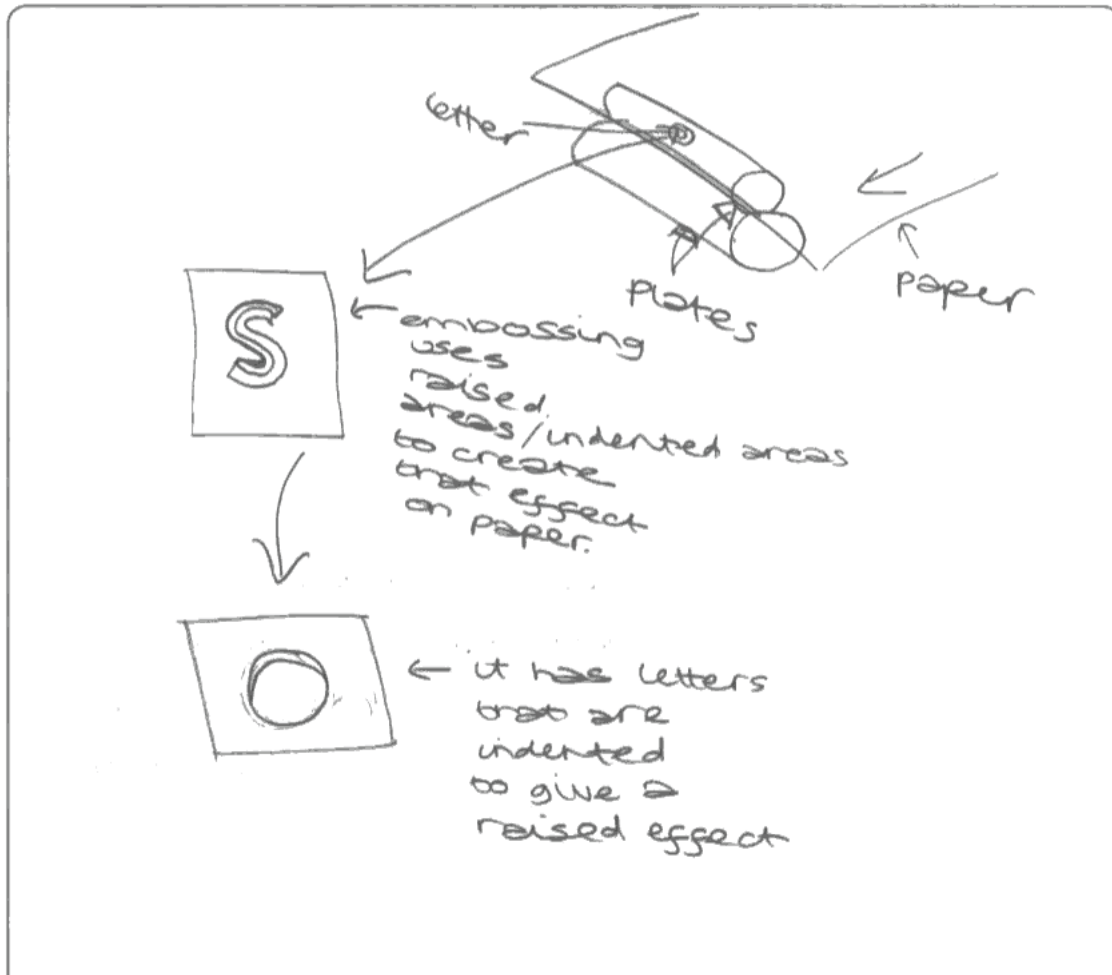
Candidates should prepare for exams by practising drawing processes, as well as responding to questions in written form.

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

(c) The cover is embossed with a pattern to add aesthetic appeal.

Using annotated sketches describe the embossing process.

(4)



ResultsPlus
Examiner Comments

The candidate here doesn't use clear sketches and the supporting annotations, whilst indicate a raised area, are not describing embossing.



ResultsPlus
Examiner Tip

Candidates should ensure they prepare for exams by sketching manufacturing processes as well as describing in written form.

Question 4 (d)

This "outline" question requires a response in full sentences with detail; in this case three separate points are needed for full marks.

The question focus here asks candidates to investigate WHY hot foil blocking is used, not what is hot foil blocking.

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

(d) Hot-foil blocking is used to print the title of the book onto the front cover.

Outline why hot-foil blocking is used. (3)

- * to achieve a high visual impact making the book stand out on the shelf
- * dry-process, therefore it doesn't need extra time to ~~wait~~ allow it to dry, speeding up its time to market.
- * ~~hot foil~~ foil is available in a wide variety of colours - therefore appealing to ~~an~~ all user groups.



ResultsPlus

Examiner Comments

This candidate achieved full marks. It is a clear and detailed response. Note that it has a bullet point form but these are extended bullet points and not single word responses so this achieves good marks.



ResultsPlus

Examiner Tip

Exam preparation that leads to bullet point notes is useful. However, it must be in long sentence form NOT single word responses.

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

(d) Hot-foil blocking is used to print the title of the book onto the front cover.

Outline why hot-foil blocking is used.

(3)

Hot foil blocking is used as it, using heat, moulds the title into paper instead of printing on it. Also, this process allows for printing thick pieces of paper. as well as Hot-foil blocking is a relatively quick process. It is also cheap and is cheaper when more is done - cost effective



ResultsPlus

Examiner Comments

Unfortunately this response is not clear and therefore achieves 0 marks. Note, the use of generalisations such as quick, cheap etc. These achieve 0 marks as they show little knowledge.



ResultsPlus

Examiner Tip

Candidates should ensure they do not use cheap, quick, fast etc in their exam preparation. Instead they should focus on specifics e.g. cheaper than printing by hand due to economies of scale etc.

Question 4 (e)

"Justify" questions need responses that include a statement and a related clear description and explanation of the statement.

The question focus here asks candidates to justify the use of recycled material in case bound books. It is not a compare question nor a description of recycled board.

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

(e) Justify the use of recycled board for the covers of case-bound books as opposed to using solid white board. (2)

Solid white board is not as strong and it is harder to print on because of the white chemical layer over it. Recycled board is also easier to use because it is lighter and thinner.

(Total for Question 4 = 14 marks)



ResultsPlus

Examiner Comments

This response gains 0 marks. The justify type question expects specific information, not generalisations about strong, easier etc.



ResultsPlus

Examiner Tip

Recyclable materials, sustainability and green issues are strongly emphasised in the AS specification. Candidates must be aware of these issues.

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

(e) Justify the use of recycled board for the covers of case-bound books as opposed to using solid white board.

(2)

Using recycled board instead of solid white card board for the case of a book is better for the environment because the making of white card board is more harmful to the environment because it releases harmful gasses into the atmosphere and recycled means that the paper is reused for another purpose and does not add to the dump sites. (Total for Question 4 = 14 marks)



ResultsPlus

Examiner Comments

This response gains full marks, it goes into real detail and fully justifies the use of recycled material.



ResultsPlus

Examiner Tip

Recyclable materials, sustainability and green issues are strongly emphasised in the AS specification. Candidates must be aware of these issues.

Question 5 (a)

This question allows the opportunity for candidates to write at length to show they have a sound understanding. In this case it is a "discussion" question; so requires four valid and detailed points within the answer.

The question focus is clearly directed on the application of stainless steel.

This question is specific in its focus but some candidates just focused on properties and not the wider issues of the material in use.

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

(a) The case of the watch is made from stainless steel.

Discuss the use of stainless steel for this type of watch.

(4)

Stainless steel is a strong, durable material and therefore is a good protector of the product. It is also shoney and pure. This makes it appealing and increases value of watch in general. However, in contradiction to this, stainless steel is quite heavy on the arm - therefore not being the best product for sports people. Also, stainless steel is relatively expensive in comparison to other materials like aluminium and tin. Although claimed as stainless, it has a tendency to dispend water marks.



ResultsPlus

Examiner Comments

A good strong response that gains full marks. The candidate fully relates the answer to the product and does not write generally about stainless steel.



ResultsPlus

Examiner Tip

Candidates should be aware of a range of popular materials used in products.

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

(a) The case of the watch is made from stainless steel.

Discuss the use of stainless steel for this type of watch.

Stainless steel is an alloy ⁽⁴⁾ ~~consisting~~ of metals such as steel, chromium etc. titanium etc. Stainless steel does not rust when in contact with water and for a modern sports watch, this is important. Stainless steel is also quite lightweight so the watch would not be uncomfortable while exercising. However, stainless steel ~~is~~ isn't particularly strong, especially if it's a sheet of stainless steel, so the watch could well get damaged or dented in the event of a knock.



ResultsPlus

Examiner Comments

This response only gains 1 mark. Unfortunately the response seems to be confusing material properties.



ResultsPlus

Examiner Tip

In preparation for exams candidates should use products and identify their materials, production processes and features.

Question 5 (b)

This question allows the opportunity for candidates to write at length to show they have a sound understanding. In this case, as an "outline" question, candidates should respond with five detailed points in sentence form.

Basic bullet point answers are not acceptable, it is preferable to use sentence form answers; although a candidate could use bullet points if they are detailed.

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

*(b) The watch has an electroluminescent (EL) lit dial.

Outline how electroluminescent (EL) lighting works.

(5)

EL lighting works by absorbing light and ~~emits it~~ ~~to~~ when it is dark it will emit light with ~~no~~ power source and when that happens a small voltage also lights lights up the dial



ResultsPlus

Examiner Comments

This response confuses EL with phosphorescent material and gains 0 marks.



ResultsPlus

Examiner Tip

During exam preparation candidates should practice longer questions to ensure they can answer in a long, detailed concise way.

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

*(b) The watch has an electroluminescent (EL) lit dial.

Outline how electroluminescent (EL) lighting works.

(5)

- Electroluminescent lighting uses a phosphor sandwiched between two electrodes.
- When a current is applied to the electrodes, the phosphor lights up and emits radiation in the form of visible light.
- The phosphor will be in front of a black background, and so the light produced will stand out and will be easy to read.
- Electroluminescent lighting converts electrical energy into visible light. It has low power consumption.
- Electroluminescent lighting can be inserted into very thin, small wires, which can be inserted into watches, or bus shelters to give them an aesthetically pleasing appearance.
- A range of colours can be created by changing the phosphor colour into three different sections of blue, red and green. The electrodes can be split into sub pixels to vary the colour.



ResultsPlus

Examiner Comments

This response gains full marks. Despite a bullet point answer, the points are sentence form and so each point is clarified. Single word bullet points would attain zero marks.



ResultsPlus

Examiner Tip

During exam preparation candidates should practice longer answer questions to ensure that they answer fully in a detailed, concise way.

Question 5c

Evaluation questions require candidates to answer fully. They need detailed, justified responses that flow in paragraph form. Short responses for 'evaluation' questions gain little marks. Candidates MUST ensure they include advantages and disadvantages or pro's, con's etc. The focus for this question is ISO9000 not just BSI.

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

*(c) Manufacturers often become accredited to the British Standards Institute (BSI) quality management system, known as ISO 9000.

Evaluate the use of the ISO 9000 quality management system and how this affects employers, their employees and their customers.

(5)

- In order to become accredited by the BSI, companies have to undergo rigorous quality control checks and risk assessments, that may cost a lot of money, and will be very time consuming. Once accredited the company can enjoy a great many benefits.
- Customers will have peace of mind, in knowing that their product has the BSI logo. As this is a sign of quality assurance.
 - Employees will bond as teams. They will need to work together to meet the ISO 9000 demands, thus providing a better working 'ethos' to the working community, and between work colleagues.
 - Employees can be satisfied that they are producing quality products, and they have a happy and content work force.
- ISO 9000 also ensures that the health and safety at the work place is sufficient. This is very important, it

The work place is sufficient. This is very important, it ~~assures~~ assures the work force that they are well treated and cared for. The employer has a happy and efficient work force. And the customer knows that the product was made and designed in a humane way, under controlled conditions.



ResultsPlus

Examiner Comments

The candidate gains full marks. They respond in a detailed way, with clear advantages and disadvantages.



ResultsPlus

Examiner Tip

During exam preparation candidates should practice longer questions to ensure they can answer in a long, detailed concise way.

Candidates must also ensure they fully read the question and answer in a relevant way.

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

*c) Manufacturers often become accredited to the British Standards Institute (BSI) quality management system, known as ISO 9000.

Evaluate the use of the ISO 9000 quality management system and how this affects employers, their employees and their customers.

(5)

~~For an~~ the ISO 9000 quality management system is advantageous for the employer, employees and their customers. This is ultimately because it is a worldwide recognized set of standards which means companies everywhere and customers will be safe in the knowledge that the products they are selling and buying has been approved by BSI. For an employer this is a massive advantage because it means they will have a high reputation for selling quality approved products that shops will feel comfortable selling and customers will feel comfortable buying. For employees, following a strict TQM system means they can effectively communicate between their departments and ensure all stages of the manufacturing process will run smoothly. For example, the assembly team for a product can be confident, with a system like ISO 9000 being used, that the product they assemble

ISO 9000 being used, that the product they assemble will have been checked as the right dimensions and tested. ~~As a result~~ Customer satisfaction will also be increased because they will want to buy (Total for Question 5 = 14 marks)

products of a high standard, TOTAL FOR PAPER = 70 MARKS
ISO 9000 confirms this for the customer so they will feel confident buying the product.



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 preparation candidates should practice longer questions to ensure they can answer in a long, detailed concise way. Candidates must also ensure they fully read the question and answer in a relevant way.

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; candidates who focus on details generally gain more marks than candidates that respond with generalisations; strong, cheap etc.

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>

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467

Fax 01623 450481

Email publication.orders@edexcel.com

Order Code US027695 June 2011

For more information on Edexcel qualifications, please visit

www.edexcel.com/quals

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Ofqual
.....



Llywodraeth Cynulliad Cymru
Welsh Assembly Government



Rewarding Learning