

Examiners' Report  
June 2012

GCE Design & Technology:  
Product Design 6GR03 01

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## Introduction

The first examination for this unit, Designing for the Future (Graphic Products), was in 2010.

The assessment of this unit is through a 2 hour written paper containing both short answer and extended writing type questions, in a question and answer booklet. All questions in the paper are compulsory, but there may be a choice offered within a question.

All questions are taken directly from the specification, but are not limited to any single part of the specification.

The questions will probe the knowledge and understanding of a range of modern design and manufacturing practices and design issues.

A good understanding of the use of ICT, and systems and control in the design and manufacture of products is required, as is how the contributions of designers from the past may provide inspiration for future design.

An awareness of the impact that design and technological activities can have upon the environment should be studied. Sustainable product design is a key feature of modern design practices.

The total marks for the paper is 70.

The exam is only available in the summer series of the year.

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 a "describe" type question. There are 2 marks available and this indicates that two separate points are required. These should be presented in sentences. Single words or short phrases are not acceptable.

The answer to this question must relate to HOW the adjustable chair can help in reducing back pain.

1 Designers need to consider key ergonomic factors when developing products for computer operators.



(a) Describe how an adjustable chair can reduce back pain when working at a computer.

(2)

- The height of the chair can be adjusted, so legs can be positioned with a  $90^\circ$  angle from the chair and feet flat on the ground.
- Back support of chair can be adjusted to provide straight support for the back and prevent from injury.



### ResultsPlus

#### Examiner Comments

This candidate has given 2 very good responses. The use of bullet points has helped the candidate to focus on giving distinctly separate but valid points.

Full marks awarded.



### ResultsPlus

#### Examiner Tip

This is a "Describe" question that, therefore requires two valid points only. They don't have to be linked to each other but need to be valid! The use of bullet points in the answer has helped the candidate to focus on the two points required.

Many candidates wrote about adjusting 'it', without specifying what was being adjusted. A high proportion did, however, appropriately refer to altering the seat height, so that a more comfortable position might be achieved.

(a) Describe how an adjustable chair can reduce back pain when working at a computer. (2)

An adjustable chair can reduce back pain by changing the height therefore allowing the user to keep an upright posture to look at the screen and by supporting the a specific part of the back by adjusting providing comfort



**ResultsPlus**  
Examiner Comments

This candidate has given 2 valid but different points in the more traditional sentence style.



**ResultsPlus**  
Examiner Tip

Candidates should try to to make their point in concise sentences, avoiding waffle.

### Question 1 (b)

Generally a well answered question. Identifying the risk caused few problems.

Explaining the ergonomic risk often resulted in only 1 of the 2 marks available being awarded.

Any question asking for an explanation requires a valid lead point, then a valid justifying reason which MUST be linked to the initial point.

The introduction combines two types of question.

Identifying the risk requires a very simple statement.

Any 'explain' question needs a valid lead point, then a valid justification which MUST be linked to the initial point.

(b) Complete the table below by:

- identifying **one** risk to the user when operating the piece of computer equipment
- explaining how the use of ergonomic design can overcome this risk.

Equipment	Risk	Use of ergonomic design
Keyboard	Bending the back to write correctly and to see the letters also being closer to it	Allow the user to write in comfortable position and being able to visualise the screen while writing with no needs to move the arms consequently.
Monitor	Back bending with damage the spine. User approach the screen to much to read with damage the eyes.	Suitable size, good quality image and a good placement as the user will stay right and at a good distance.



**ResultsPlus**  
Examiner Comments

This candidate has failed to identify valid risks associated with the keyboard and monitor. The explanations given under the use of ergonomic design fail to identify any satisfactory points.



**ResultsPlus**  
Examiner Tip

Only a brief statement is needed for each RISK in part 1. Part 2 is an "explain" question therefore, it requires a JUSTIFIED response, i.e. the candidate must give a valid lead point, then give a valid justifying reason.

The most regular responses were: RSI – keyboard correct height / angle – wrist pad support on keyboard; eye strain / headaches – tilt screen / use of filter – to reduce glare.

Many candidates achieved full or almost full responses here.

(b) Complete the table below by:

- identifying **one** risk to the user when operating the piece of computer equipment
- explaining how the use of ergonomic design can overcome this risk.

Equipment	Risk	Use of ergonomic design
Keyboard	Wrist Strain	Having a gel pad beneath the keyboard to support the wrists.
	(1)	(2)
Monitor	Glare - Eye Strain	Adjustable Monitor, so the screen can move up and down, also by tilting back and forth will avoid eye strain.
	(1)	(2)



**ResultsPlus**  
Examiner Comments

An extremely good answer showing just how little is needed to gain full marks for the identifying the risk. The risk statements are succinct and correct.

The explanations give valid points and then expressed what is done to make the point successfully.



**ResultsPlus**  
Examiner Tip

Candidates should practise writing succinct statements rather than rambling through answers.

## Question 2 (a)

The majority of candidates showed some knowledge of what is involved with built-in obsolescence.

Again, this is an 'explain' question. A large number of candidates failed to gather the second mark through not linking the first point with a valid justification of that point.

The answer should refer to an aspect of built-in obsolescence.

2 Manufacturers frequently ask designers to build obsolescence into their products.

(a) Explain the term 'built-in obsolescence'.

(2)

this is so after a period of time the product will be <sup>outdate/</sup> come run down & require updating or replacing. when designers release a product knowing the next advancement in mind



### ResultsPlus Examiner Comments

This is a very good answer showing how the point is made and then elaborated on. They are different points to those in the mark scheme. This is acceptable. The marks are awarded because this question allows the mix and match technique.



### ResultsPlus Examiner Tip

Candidates should ensure they answer 'explain' questions with a valid point and then give a valid reason linked to the point made, in order to gain full marks.

2 Manufacturers frequently ask designers to build obsolescence into their products.

(a) Explain the term 'built-in obsolescence'.

(2)

This is when a certain part of a product will be manufactured to stop functioning after a certain amount of time which will make consumers buy more.



**ResultsPlus**

**Examiner Comments**

A full answer giving a valid point from one part of the mark scheme, and a reason why from a different part of the mark scheme.

### **Question 2 (b)**

Generally a well answered question.

Most candidates gave valid statement outlining how obsolescence occurs for each type and gave a suitable example.

This is a knowledge based "give" style of question. A single word for the product example and a short phrase for the statement is adequate.

(b) Complete the table below. Provide **one** statement outlining how obsolescence occurs for each type listed below and give **one** product example for each type.

Type of obsolescence	
Technological	<b>Statement</b> where the product will be replaced by a newer more technically advanced product of the same type. (1)
	<b>Product example</b> mobile phone (1)
Style	<b>Statement</b> where the product is not deemed stylish for that certain 'era' and will be replaced by newer fashionable products. (1)
	<b>Product example</b> clothes (1)
Physical	<b>Statement</b> where the product physically will not function as required and will have to be replaced due to wear and tear. (1)
	<b>Product example</b> a light bulb. (1)



**ResultsPlus**  
Examiner Comments

This candidate has given good responses identifying the type of obsolescence and stated acceptable product examples.



**ResultsPlus**  
Examiner Tip

Avoid repeating the same example for each response. Different examples are required to show a candidates full understanding of the problem.

Here again, an understanding, or otherwise, of 'obsolescence' was the key factor. Notwithstanding this limiting factor, of those who did progress down the right track, most seemed to achieve half marks or better.

The 'physical' type appeared to gain the least appropriate responses.

(b) Complete the table below. Provide **one** statement outlining how obsolescence occurs for each type listed below and give **one** product example for each type.

Type of obsolescence	
Technological	<p><b>Statement</b> when product has a certain time built in before it stops working and starts to wear out (1)</p> <p><b>Product example</b> MY LAPTOP! Or any laptop (1)</p>
Style	<p><b>Statement</b> when product is purposely designed for the style to be out dated in terms of trends (1)</p> <p><b>Product example</b> Clothing- (1)</p>
Physical	<p><b>Statement</b> when a product makes LITTLE updates to a product and then sent out even though it is possible for it to be better than what had been launched (1)</p> <p><b>Product example</b> Apple iPhone 4s and iPhone 4 have little difference! Yet the company are able to produce something better! (1)</p>



**ResultsPlus**  
Examiner Comments

This candidate has not given a clear statements of the types of obsolescence, 'style' being the only one where understanding is shown.



**ResultsPlus**  
Examiner Tip

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

### Question 3 (a)

A full range of responses were seen for this question. Some showed a sound understanding of the topic, and others displayed little understanding of ISDN. This question asks for the characteristics of ISDN, not for an explanation what ISDN is. It is an 'outline' question, so it is looking for three separate points that do not have to be linked.

This is an 'outline' style of question which requires a series of detailed sentences on the topic. In this case, the characteristics of Integrated Systems Digital Network are being asked for.

3 Computers connect to the world wide web in various ways.

(a) Outline the characteristics of an Integrated Systems Digital Network (ISDN).

(3)

ISDN allows the digitisation of voice, text, graphics, music and video over an already existing telephone line. It uses an already existing telephone exchange to allow internet and phone to be used at the same time.



**ResultsPlus**  
Examiner Comments

This is a clear and succinct answer. Two points, if valid, can be made in one sentence, as shown.



**ResultsPlus**  
Examiner Tip

In an 'outline' question, full sentences are required, not just one word or brief phrases.

Most candidates knew that Broadband had superseded ISDN, so did not come up with positives.

Popular responses were: 'faster / internet connection / use of phone line / dial-up service. The majority achieved 2 or 3 marks.

3 Computers connect to the world wide web in various ways.

(a) Outline the characteristics of an Integrated Systems Digital Network (ISDN). (3)

ISDN is a dial up service in which enables households ~~or companies~~ to connect to the internet to browse or communicate. The ISDN enables a computer to access the internet through the telephone line, which means once a phone call comes through, it consequently cuts the internet connection.



**ResultsPlus**

**Examiner Comments**

This answer has given four valid points in a very concise and acceptable fashion.



**ResultsPlus**

**Examiner Tip**

A candidate can identify the number of points they should give in an answer by looking at the number of marks awarded to the question. They will be awarded one mark for each different correct point made.

In this example 3 marks are available, so three different points should be given.

### Question 3 (b)

This question asked why broadband has replaced ISDN, so the focus should be on the advantages of broadband AND how it helps, not what its applications are.

Generally a well answered question with candidates being able to focus on the advantages of broadband over ISDN.

Again it must be pointed out that the general rule is one mark per valid point made. In this question 5 marks are available; hence examiners looked for five points.

Many candidates failed to give five valid points. Instead wrote copiously on only two or three points.

The majority of candidates demonstrated a reasonably clear understanding of why broadband has displaced ISDN. Overall the responses to the question were reasonably well informed and coherent.

A good range of responses were given with many achieving 3 marks or better.

(b) Discuss the reasons why broadband has displaced Integrated Systems Digital Network (ISDN) dial up services in the information and communication technology industry. (5)

Broadband is more efficient comes in a variety of ways to access eg. cable, wireless, 3G and satellite.

Therefore can adapt for different reasons for example 3G & satellite can be used anywhere as they are mobile satellite being the most efficient allowing any software and only limited by weather eg rain/storms. unlike integrated systems which you can only use in certain areas.

Broadband can be used for both upload & down load. its faster than ISDN and can be used in homes.



#### ResultsPlus Examiner Comments

This candidate has offered three valid points. The middle paragraph only develops points already made.



#### ResultsPlus Examiner Tip

A simple tip is to identify the number of marks available, then use bullet points to that number, writing a full sentence on each point.

The single most common response was that broadband was 'faster'. Other popular responses were 'use of wireless and wifi, two channels and large amounts of data'. Some then mentioned 3G.

(b) Discuss the reasons why broadband has displaced Integrated Systems Digital Network (ISDN) dial up services in the information and communication technology industry.

(5)

Broadband can be ~~installed~~<sup>used</sup> over an existing cable line making it easier to install compared to ~~broadband~~ ISDN. Broadband has much faster download and upload speeds and can have multiple connections at once allowing the use of the phone. Broadband deals that usually contain phone bills and internet are common making it cheaper than ISDN. Information can be sent by companies faster using broadband. This allows smoother video conferencing and faster sending of email etc. Broadband can be used to incorporate wireless technology which could allow multiple devices to connect to the internet at one time. This would not be possible with ISDN. This has made broadband invaluable inside large companies with many systems connected to the internet.



**ResultsPlus**

**Examiner Comments**

This is a full and accurate answer gaining full marks.



**ResultsPlus**

**Examiner Tip**

This example, like many others in this document, shows neat and easy to read writing. Unfortunately with many scripts the handwriting was very poor and at times almost impossible to decipher.

Candidates must try harder to produce much neater handwriting.

## Question 4 (a)

Many of the comments already made in QU01(b) previously, can be repeated for this question. It is an 'explain' question and a large number of candidates failed to gather the second mark through not linking the first point with a valid justification of that point.

A further cause for concern is the number of candidates who failed to read the question properly and instead of giving disadvantages, opted to explain the advantages.

This question is about the DISADVANTAGES of CAM.

This proved to be a poorly answered question with only a minority achieving the full 4 marks.

Some candidates failed to read the question carefully and answered using advantages.

4 Computer aided manufacture (CAM) is an essential part of a computer integrated manufacturing (CIM) system.

(a) Explain **two** disadvantages of computer aided manufacture (CAM) over manually operated machines.

(4)

1 A manually ~~operated~~ machine is able to make changes if a problem is found when they are producing the product. This means that the product ~~can~~ could still work with the changes made to it.

2 A computer aided manufacture system ~~could be~~ is quicker but this may lead to errors which can be prevented if a slower manual machine is used.



**ResultsPlus**  
Examiner Comments

This example shows answers that are very vague and confused. No mention of the disadvantages of computer aided manufacture is made in either part of the answer.



**ResultsPlus**  
Examiner Tip

Candidates should ensure they answer 'explain' questions with a valid point, and then give a valid reason linked to the point made in order to gain full marks.

Many candidates achieved 2 of the available 4 marks. Very few achieved full marks. Popular responses were 'expensive to buy' and 'fewer low skilled workers needed'.

4 Computer aided manufacture (CAM) is an essential part of a computer integrated manufacturing (CIM) system.

(a) Explain **two** disadvantages of computer aided manufacture (CAM) over manually operated machines.

(4)

1 Using computers removes the need for unskilled workers, thus increasing unemployment and increasing to companies reliance on computers -

2 Skilled, highly paid workers will be needed to install, maintain and fix the computers which could cost the company a large amount of money



**ResultsPlus**

**Examiner Comments**

This is one of the better responses scoring 3 out of the 4 marks.



**ResultsPlus**

**Examiner Tip**

Candidates should ensure they answer 'explain' questions with a valid point, and then give a valid reason linked to the point made in order to gain full marks.

## Question 4 (b)

Generally this question was poorly answered, with candidates showing only a limited understanding of computer integrated manufacturing.

The question is a 'discuss' type. Examiners were looking for four different valid points only. They did not have to be linked to each other, but needed to be valid and had to be advantages.

Many candidates did not appear to understand that CIM is the integration of all aspects of the manufacturing system. Many discussed the benefits of CAD/CAM. This did allow some to achieve 2 or 3 marks. Those that understood CIM frequently achieved the full 4 marks.

(b) Discuss the advantages to a manufacturer of using a computer integrated manufacturing (CIM) system.

(4)

An advantage of a CIM system is the efficiency. As its all computer run, the whole manufacturing process is swift which saves time for more products to be made. This leads to the system being cost effective as more manufacturing can take place. Another advantage is the quality assurance checks. At each stage of the manufacture of products, quality control can take place thanks to computer technology which leads to a high quality finished product.



**ResultsPlus**

**Examiner Comments**

Many of the comments made in this question were generalised and could refer to many methods of manufacturing. They were not specific to CIM. Quality control being a case in point.



**ResultsPlus**

**Examiner Tip**

Read the question and focus on the topic being examined.  
Do not answer with stock phrases that could apply to many other areas.

Popular responses to this question included JIT, cost effective, no human error, improves productivity, reduces lead times, quick response of demand, shared by departments and communication.

(b) Discuss the advantages to a manufacturer of using a computer integrated manufacturing (CIM) system.

(4)

The whole process from design to manufacture can be combined meaning an increase in efficiency because it reduces the time. By using fully automated machinery it eliminates the risk of human error and there is less waste produced. The automated machinery can also carry out monotonous jobs repetitively with the same amount of precision. It also reduces lead times and go on the market quicker to increase market share and profits. QFD can also be used and CNC to increase quality and precision. Lean manufacturing and just in time strategies can be put in place reducing costs and time.



**ResultsPlus**  
Examiner Comments

A full answer given here with sufficient detail to overcome stock phrases.



**ResultsPlus**  
Examiner Tip

Read the question carefully. Then answer what is asked for.

## Question 5 (a)

A very simple question requiring one piece of knowledge, ie the type of feedback system required for automatic guided vehicles.

5 Advanced manufacturing systems often include automated guided vehicles (AGVs).

(a) Name the type of feedback system used in automated guided vehicles (AGVs).

(1)

closed loop.



**ResultsPlus**

**Examiner Comments**

Any answer that included the words 'closed' and 'loop' gave acceptable answers.

5 Advanced manufacturing systems often include automated guided vehicles (AGVs).

(a) Name the type of feedback system used in automated guided vehicles (AGVs).

(1)

sensory



**ResultsPlus**

**Examiner Comments**

One of the many guesses made at this question

## Question 5 (b)

Candidates were asked to describe a system used for automated guidance vehicles. The question is a "Describe" question; therefore it requires three different valid points only. Generally, this was a very poorly answered question with few candidates being able to describe a valid guidance system used for automated guidance vehicles.

Very few candidates were aware of how AGV's are controlled. Many candidates tried to describe systems that were totally incorrect. There were quite a few who just described how a forklift truck would go and collect or deliver items in a warehouse, but with no mention of AGV's.

Some candidates were aware of laser, or wires in ground. Few candidates were awarded the full 3 marks.

It was interesting to note, however, that a minority thought that AGV's were guided by such things as train tracks, auto-pilots, thermal vision systems, heat cameras, conveyor belts, follow the truck in front'. Many of these wrote about what AGV's do, rather than how they do it.

Overall responses were inconsistent and lacked depth or sound knowledge.

(b) Describe **one** type of guidance system used in automated guided vehicles (AGVs). (3)

A Fork truck can move parts and components to and from storage units. A Fork truck can service loads in a storage unit referring to instructions given by a central computer or an on-board system. Also, a fork truck can stack loads on floor level which is convenient for items that only need delivering. Fork trucks can also stack loads at higher levels not just floor levels which offers a range of uses so that other components can be stored where needed.



**ResultsPlus**  
Examiner Comments

At least in this example, it has been recognised that instructions have been given by a central computer.

(b) Describe **one** type of guidance system used in automated guided vehicles (AGVs).

(3)

One type of AGV guidance systems is magnetic tracks laid under the factory floor. An AGV will follow these tracks to different parts of the factory/warehouse, transporting or retrieving products and materials. They can be programmed to follow different tracks or directions, creating a simple form of AGV system.



**ResultsPlus**  
Examiner Comments

A full answer gaining the maximum marks.



**ResultsPlus**  
Examiner Tip

'Describe' questions do not require an expansion of the identified point.

## Question 5 (c)

This question is looking for how concurrent manufacturing helps quick response manufacturing. The question is an "Explain" question, therefore requires a JUSTIFIED response, i.e. the candidate must give a valid lead point then give a valid justification reason.

Generally this was a very poorly answered question, with few candidates being able to explain how concurrent manufacturing enables quick response manufacturing.

Very few candidates understood that concurrent manufacturing is a system involving key representatives from each area of the manufacturing system forming teams to address the planning and co-ordination of the manufacturing enterprise. Those that did provided some detailed answers. Many candidates were awarded 1 mark for a relevant reason but they did not justify their answer to achieve the second mark.

(c) Explain **two** ways in which concurrent manufacturing enables quick response manufacturing (QRM). (4)

1. concurrent manufacturing means that changes can be made at any part of the ~~design~~ manufacturing process in order to improve the product. if things are not working
2. concurrent manufacturing allows the design of the product to be changed and then almost immediate manufacture, which is efficient and cost effective.



**ResultsPlus**

**Examiner Comments**

Examiners have reported that the questions concerning forms of manufacturing have in general been poorly answered.

The responses tend to be stock phrases and not specific to the topic identified in the question.



**ResultsPlus**

**Examiner Tip**

Candidates should ensure they answer 'explain' questions with a valid point, and then give a valid reason linked to the point made in order to gain full marks.

Popular responses were teams from all departments, lead times reduced, more efficient, helps early release of new products, right first time, reduces time to market and JIT.

(c) Explain **two** ways in which concurrent manufacturing enables quick response manufacturing (QRM).

(4)

1. Concurrent manufacturing means that all the people involved in the product work together at each stage, therefore problems can be identified and solved 'first time' increasing speed to market.
2. The production is more efficient because at each stage the product could be analysed by the relevant person increasing quality and speed as any design faults are worked out as it goes along, rather than be handed down to the next person and them finding the problem, increasing production speed, enabling them to finish the product faster and then move onto the next product making the company more profit.

(Total for Question 5 = 8 marks)



**ResultsPlus**

**Examiner Comments**

This is a very full answer.

Candidates must, however, try to get the information to answer the question in the space provided.



**ResultsPlus**

**Examiner Tip**

Candidates should avoid trying to put their answers in spaces where lines have not been provided.

They should practise writing concise answers.

## Question 6 (a) (i)

This is a 'discuss' question, which therefore requires three different valid points. The question is looking for the environmental issues connected with producing polymer casings with regard to raw materials i.e., extraction for the case.

A well answered question in most cases with many achieving full marks.

Popular responses were energy used to extract, energy use to process, transportation pollution, saves finite resources, pollution from processing, and the environmental impact on habitat.

At times the terms used were fairly generic and non specific.

6 Life cycle assessment (LCA) is used to assess the impact of a product 'from the cradle to the grave'.

(a) Discuss the environmental impact of producing the polymer casing of a new mobile phone with specific reference to:

(i) Raw materials

(3)

First of all, materials need to be extracted, which uses a lot of energy. Oil first needs to be extracted, and then refined, using energy, which will give off CO<sub>2</sub> emissions into the atmosphere.



**ResultsPlus**  
Examiner Comments

A full and concise answer given here.

The answer clearly focuses upon the environmental impact.



**ResultsPlus**  
Examiner Tip

Keep answer focused on the main thrust of the question and avoid waffle.

6 Life cycle assessment (LCA) is used to assess the impact of a product 'from the cradle to the grave'.

(a) Discuss the environmental impact of producing the polymer casing of a new mobile phone with specific reference to:

(i) Raw materials

The polymer that this phone is made from <sup>15</sup> <sup>(3)</sup> ~~is~~ plastic crude oil which ~~is~~ comes from the earth. This raw material has to be ~~then~~ brought up to the earth's <sup>underground</sup> ~~surface~~ <sup>surface</sup> which takes a huge amount of money the the crude oil has then to travel to the factory where the process of manufacturing will take place.



**ResultsPlus**  
Examiner Comments

This example has not focused upon the environmental impact. Instead the answer refers to costs.

## Question 6 (a) (ii)

This question is looking for the environmental issues of producing polymer casings with regard to manufacturing the case.

The question is a "Discuss" question, therefore requires three different valid points. A well answered question by many candidates with energy, global warming and emissions being the most common answers. Some did also include raw material answers as well as manufacture. Many discussed the environmental impact of shaping plastics and were awarded three marks.

As with question Q6(a)(i), many candidates achieved good marks for this question by focusing on the environmental issues of producing polymer casings with regard to the manufacturing process.

(ii) Manufacture (3)

Chemical reactions in manufacturing processes can pollute the environment causing harmful effects towards global warming. Manufacturing processes will also produce noise pollution which may harm animals inhabited in the area. The manufacturing processes may also use dangerous chemicals which if accidentally exposed to the environment directly could damage wildlife.



**ResultsPlus**  
Examiner Comments

A very full answer covering the main points.



**ResultsPlus**  
Examiner Tip

In this example, the sentences used are good. Each includes a small explanation of why the point made is included.

For example "chemical reactions... pollute the environment ..."

It shows why sentences are expected rather than short phrases.

Some candidates gave the same answers for this question as Q6(a)(i), writing about extraction rather than manufacture.

A significant few moved away from the question to suggest using alternative environmentally friendly materials.

(ii) Manufacture (3)

When creating the casing, the machinery used could be harmful to the environment as it could contribute to global warming. Waste is also a problem, however ~~this~~ this can be overcome by recycling.



**ResultsPlus**

**Examiner Comments**

The sentences offered fall short of explaining the key concept. Had energy been mentioned, it would have helped to explain what was harmful and why.



**ResultsPlus**

**Examiner Tip**

Focus on the question and answer what it is asking for.

## Question 6 (b)

This question asks how 'repair versus replacement' has a positive environmental impact. It is an 'explain' question, and therefore requires a JUSTIFIED response, i.e. the candidate must give a valid lead point, then give a valid justifying reason which MUST be linked to the initial point.

Few candidates scored full marks on this question. Many gave several points where only one was needed, but then failed to offer a valid reason why.

(b) Explain, with reference to a mobile phone, how 'repair versus replacement' can ~~environment~~ have a positive environmental impact. (2)

~~It~~ It can have a positive effect because if it is replaced the old mobile phone <sup>(NOKIA X5)</sup> might be chucked away which bad for the environment and if it is repaired then it isn't chucked away which would be good for the environment.



**ResultsPlus**

**Examiner Comments**

This candidate has tried to answer the question by rewriting question in various ways. There is nothing on how recycling can have a positive effect, or why.



**ResultsPlus**

**Examiner Tip**

Avoid answering a question by rewording it. Specific points relevant to the question are expected.

Many candidates referred to the energy used, greenhouse gases/global warming, pollution/emissions and transportation. However, many other candidates seemed to become slightly confused, and stated the effects of the extraction of raw materials.

(b) Explain, with reference to a mobile phone, how 'repair versus replacement' can have a positive environmental impact.

(2)

If a phone is ~~repla~~ repaired instead of replaced it would reduce landfill but also less energy would be used in production there for emitting less carbon in to the surroundings



**ResultsPlus**

**Examiner Comments**

This candidate has failed to develop "reduce landfill" but the "less energy used" is developed by "less energy".



**ResultsPlus**

**Examiner Tip**

Always try to develop a point made with a justification, especially with an 'explain' question.

## Question 7 (a)

This question was reasonably well answered, however many did not confine themselves to economic issues and stated environmental considerations in answer to the question "is it worth doing?".

Many answers were inconsistent and repetitive at times, with some asking questions rather than giving answers. However, candidates clearly understood the question of sales/profit and demand. After making these points though, many responses rambled and failed to be specific. The majority of candidates understood the concept of demand and profit, some referred to cost of materials, running costs etc and costs of production. Few candidates referred to the effect on developing nation, fair trade issues or disposal of waste/taxation.

Instead of focusing on the economic issues connected with designing a new product, much was written about the moral issues.

This question is looking at what economic issues are raised by the question "is it worth doing?" This is an "Outline" question, therefore it requires four key statements. They don't have to be linked to each other, but do need to be valid.

7 When designing a new product the question 'is it worth doing?' should be frequently asked.

(a) Outline the economic issues raised by this question for commercial designers and manufacturers.

(4)

When a product is being designed/developed designers and manufacturers have to make several things: is it too expensive to produce, which means it has to be sold at a higher price, will the market buy it at that price, does it fulfil its function, is it of a suitable form that will appeal to the target market, does it have a USP, cost of materials and manufacturing processes, time taken to produce, scale of production. All these many questions must be answered and if a product costs too much money to make doesn't have a USP and isn't of a suitable quality for the target market to buy at a higher price to make profit then it isn't worth producing. The opposite is applicable for the reverse. Costs and form/function need to be fully considered to decide if a product is worth bring-



**ResultsPlus**  
Examiner Comments

A very good response to the question.



**ResultsPlus**

Examiner Tip

This question could be answered using bullet points. There are 4 marks available, therefore four points separate, valid points are expected.

7 When designing a new product the question 'is it worth doing?' should be frequently asked.

(a) Outline the economic issues raised by this question for commercial designers and manufacturers.

(4)

A product has to have useful properties and need to exist for something, it has to have something innovating or people won't have any reason to buy it and so the ~~product~~ designers and manufacturers would have lost time and money. ~~During the~~ From design to creation of the product # useless actions and details has to be avoid so there is no waste of time and money



**ResultsPlus**

**Examiner Comments**

A rather confused response to the question. The candidate has failed to focus on the key point and has also not given four valid points.



**ResultsPlus**

**Examiner Tip**

An example of where bullet pointed answers may have helped the candidate to give separate points to answer the question.

## Question 7 (b)

This question was answered well by many candidates. They were able to provide detailed explanations of the benefits of internet marketing. Many candidates were awarded the full 4 marks. Candidates showed very good awareness of internet marketing methods.

Popular responses were: large market, global, cheaper than traditional methods of advertising, specific groups can be targeted, no shops needed, and links to other sites.

Most candidates managed to score quite well on this question by focusing on the marketing of a product via the internet.

Again it must be pointed out that the general rule is one mark for each valid point made. In this question 4 marks were available; hence examiners looked for 4 points.

Many candidates failed to give 4 valid points. Instead they wrote copiously on only 2 or 3 points.

A simple tip is to identify the number of marks available, then use bullet points to that number, writing a full sentence on each point.

This question is looking for the advantages of internet marketing to a manufacturer? This is a "Discuss" question with 4 marks available, therefore it requires four different valid points only, but they must be describing advantages.

\* (b) Discuss the **advantages** to the manufacturer of using the internet for marketing a product. (4)

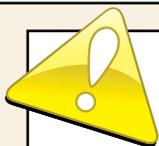
cheaper than other methods such as paper leaflets, can get out to places a lot further away, broads the market and is a lot quicker. ~~then buying out~~ IT is good because the price is easily comparable and you can make money against your competition



**ResultsPlus**

**Examiner Comments**

Many candidates misread the question and wrote about the procedures for buying a product via the internet, rather than the required marketing focus of the question.



**ResultsPlus**

**Examiner Tip**

Read the question carefully then answer what is asked for.

Popular responses to this question were large market, global, cheaper than traditional methods of advertising, specific groups can be targeted, no shops needed, and links to other sites.

\*(b) Discuss the **advantages** to the manufacturer of using the internet for marketing a product.

(4)

It allows manufacturers to research the market sales trends <sup>and</sup> advertise their products on various websites (as the ad 'pops up') which is cheaper than advertising on television. The manufacturer can sell products online to a wide range of people, even across the world widening the market and increasing sales. Sales transactions ~~at~~ and correspondence all take place electronically ~~from~~ and quickly removing the need for paperwork and postal sending.

(Total for Question 7 = 8 marks)



**ResultsPlus**  
Examiner Comments

A very clear response to the question focusing on the key points.

## Question 8

This question was looking for the advantages & disadvantages of nuclear power for producing energy. It is an "Evaluate" question, and must therefore the answer must include positive and negative points, If only one side of the argument is presented, then a maximum of 5 marks could be awarded.

This question was very well answered with most candidates being very aware of the issues surrounding the use of Nuclear Energy. Many candidates achieved 5 or 6 marks. Most candidates provided balanced answers with positive and negative reasons put forward. Some responses evidenced confusion, by for example referring to nuclear power as a fossil fuel, or a renewable energy resource.

Most common answers included plenty of uranium available, no greenhouse gases, vast amounts of energy produced, high cost to build, previous reported accidents causing mistrust, and disposal/storage of poisonous waste.

\*8 Evaluate, using **both** advantages and disadvantages, the use of nuclear power for producing energy.

Advantages:

- It is a very efficient way of producing energy.
- Nuclear power does not depend on the weather
- Uranium is a widely available material
- Nuclear power stations can be placed almost anywhere because certain natural features are not needed.
- It creates heat that can be used to heat the power station.

Disadvantages:

- Nuclear power is quite unpopular in the public's eye because of the media coverage such as Chernobyl.
- Nuclear power can be used to create weapons that can be used against people.
- Nuclear power stations can over heat and release radioactive substances into the atmosphere causing illness and deformation of ~~the~~ fetus.



**ResultsPlus**  
Examiner Comments

This is a very good example of answering a question using bullet points.



**ResultsPlus**  
Examiner Tip

Note that the answers have been given in full sentence form.

Short phrases are not acceptable for this type of question.

\*8 Evaluate, using **both** advantages and disadvantages, the use of nuclear power for producing energy.

Advantage of nuclear power source is that it is an abundant source, it is available by mining. It is efficient and produces a lot of energy. Does not produce green gasses<sup>compared to coal</sup>. Heat released by the production of Uranium fusion could be used to heat the power plant. It is cheaper than extracting and getting from coal, biofuel, produces more yield. It is difficult to store the uranium as it is radioactive and must be taken care when working around as the <sup>radioactive</sup> radioactivity may affect workers ~~to~~ health. The waste product is difficult to get rid, as it takes years to <sup>decay</sup> decay. It is seen as a dangerous source, after the Chernobyl incident that took place in the past and also the recent Japan radioactive contamination incident. Mining requires a drilling/mining sight to obtain the Uranium, which may affect the environment and the surrounding infrastructure. It is a finite, non renewable source<sup>of energy</sup> meaning it will run out eventually in the far future - Requires specialised power plants.



**ResultsPlus**  
Examiner Comments

A very full answer given without the use of bullet points.

It is interesting to compare the two approaches. Both achieved high marks.

## **Question 9**

This question is looking for the advantages and disadvantages of using Artificial Intelligence on fully automated production lines. It is an "Evaluate" question, and therefore the answer must include positive and negative points. If only one side of the argument is presented, a maximum of 7 marks could be awarded

Many candidates' responses demonstrated some understanding of the advantages and disadvantages of using a fully automated artificial intelligence production and assembly line. They were not always consistent, and often repeated the same points, reworded. Most candidates were awarded some marks, however few achieved above 4-6 marks. Some candidates did not provide enough specific details in their answers to gain a mark, such as writing that it is `quicker` without providing any explanation.

Some candidates failed to understand the question and answered it generally about CAM rather than AI. This gave them most of the marks.

\*9 Evaluate, using advantages and disadvantages, the use of fully automated production and assembly lines incorporating artificial intelligence (AI) when manufacturing products.

The use of fully automated production + assembly lines are that its much quicker for quality. Because of the ~~AI~~ <sup>AI</sup> products can be made to a very detailed specification. Therefore quality of products are of great standard.

one major disadvantage would be the expense of manufacturing products ~~with~~ with artificial intelligence. cost more to produce so costs more to sell so products are of high quality and of standards for people who can afford it therefore limiting the market of customers who will actually buy a product. Although production is quicker getting the intelligence can take time especially for new products, more research is needed to gain high artificial intelligence.



**ResultsPlus**

**Examiner Comments**

This is an example of not really answering the question in terms of AI.

As was noted earlier some candidates showed limited understanding of manufacturing systems.

The use of bullet points has helped this candidate to identify many points in answering this question. A lot of the points are valid and the candidate gained a very good mark for the work.

\*9 Evaluate, using advantages and disadvantages, the use of fully automated production and assembly lines incorporating artificial intelligence (AI) when manufacturing products.

advantages

- fast, can complete given task quicker than human
- can work in all conditions & environments
- can be more accurate than human
- computer can adjust robot data to do different things
- they don't need to be paid, save money
- can work 24/7 without any breaks
- they are designed to look like humans to give it intelligence.

↳ disadvantage

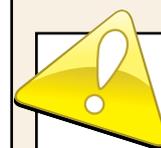
- expensive to buy/make
- expensive and hard to set up/install
- required skilled/trained workers to function AI,
- cost a lot to maintain, when broken down
- it can crash, run on power or it will stop
- it can't think like human & do things by themselves

(Total for Question 9 = 8 marks)



**ResultsPlus**  
Examiner Comments

The answers provided are often very short and fall at the very bottom limit of acceptability. The examiner could well have linked some of the responses together to be able to give a mark. For example "expensive to buy/make" alone would not be enough, but the next line gives the previous line enough for the mark.



**ResultsPlus**  
Examiner Tip

More care is needed to avoid the use of stock phrases that can equally apply to other manufacturing processes

## Paper Summary

Candidates should read the question carefully and then highlight the key words.

Many candidates misread or misinterpreted the question, and gave answers that did not pertain to the question.

There was a tendency amongst some candidates to repeat, in different forms and phrasing, the same information or rewrite the question in a different form, at times using the rewrite as their answer.

As a general rule candidates should work on the principle of there being 1 mark available for each different point made. For a question worth 6 marks, there should be six clearly defined and different points outlined in the response.

Bullet points can provide great help to candidates in marshalling their thoughts/ideas, but they must be in a sentence form and not written as a simple note.

It should be remembered that the space allocated after the question is deemed sufficient for a good answer.

Answers must not be put in any other part of the booklet. If it does not fit in the space provided then use an additional sheet.

If additional sheets are used it usually means that the candidate is not being succinct in their answer.

Finally many examiners reported that poor handwriting is becoming an issue. Candidates must remember that their writing has to be read in order for them to be awarded marks. They should take care to make their writing legible.

## **Grade Boundaries**

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