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Examiners' Report

June 2011

GCE Design and 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.

The paper is a question and answer booklet and all questions in the paper are compulsory. There may be a choice offered within a question.

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 of 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.

Question 1

This question was generally well answered. However, many responses ignored the environmental aspects as asked for in the question. There were answers referring to the properties of the bags such as lightweight, easily folded and expensive. Some referred to bags being "strong" which was not accepted but "durable" was as it implied that the bag could be reused.

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

- 1 Carrier bags are a major concern to wildlife and the environment. The table indicates three types of carrier bag in common use.

Complete the table by identifying **one** environmental advantage and **one** environmental disadvantage for each carrier bag.

Type of Carrier bag	Advantage	Disadvantage
Paper carrier bag	<u>Bio-degrades</u> <u>Recyclable</u>	<u>Water/Liquids</u> <u>can easily</u> <u>damage it</u>
	(1)	(1)
Plastic carrier bag	<u>Water resistant</u>	does not bio degrade
	(1)	(1)
Eco friendly plastic carrier bag	can bio-degrade (over 40-50 years)	More expensive to make than plastic carrier bags
	(1)	(1)

(Total for Question 1 = 6 marks)



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Examiner Comments

The advantages and disadvantages of paper carrier bags in this example have been reasonably well answered, the disadvantage implying litter problems.

The advantage of plastic carrier bags was far too vague and consequently no mark awarded. Strong was not a suitable description, examiners were looking for durable.

The disadvantage was worth a mark. The eco friendly bag advantage was a good answer. The disadvantage was not acceptable. It is too vague; the bag could be stronger hence negating the whole response.

This answer gained 4 out of 6 marks.



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Examiner Tip

The answer provided should be short and concise.

Many candidates wrote volumes and wasted a lot of their valuable time. The advantage response to the eco friendly bag could have stopped at "can be reused". This would have been more than sufficient for this section.

This example shows that for 1 mark answers a simple statement is all that is needed.

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

- 1 Carrier bags are a major concern to wildlife and the environment. The table indicates three types of carrier bag in common use.

Complete the table by identifying **one** environmental advantage and **one** environmental disadvantage for each carrier bag.

Type of Carrier bag	Advantage	Disadvantage
Paper carrier bag	A paper carrier bag can be recycled so this would reduce waste on landfill sites. (1)	They are not very strong so more have to be used to hold products, which means more are thrown away. (1)
Plastic carrier bag	Stronger than paper carrier bags, so it is able to hold more, which means less are used and end up on landfill sites. (1)	Because they are stronger and thicker this means that they will take longer to bio degrade on a landfill site. (1)
Eco friendly plastic carrier bag	Can be reused, however if it is thrown away it will biodegrade quicker than a normal plastic carrier bag. (1)	They are not as strong as a normal plastic carrier bag so more are used as they are made from recycled materials. (1)

(Total for Question 1 = 6 marks)



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Examiner Comments

This response gained 4 marks out of the 6 available. 1e, time factor not appropriate. 1f, is not an environmental issue.



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Examiner Tip

Marks lost here because the candidate has failed to focus on environmental issues for the last two answers. A good tip is to underline / highlight the key points in the question. This could help focus the answers.

Question 2 (a)

Generally a well answered question with candidates achieving good marks.

The most common responses identified were resistance to disease/reduction of lignin/ reduction of chemicals/increased growth rate.

Some candidates misunderstood the question and discussed using recycled paper or the use of biofuel in production.

This is a good response to the question.

It clearly outlines the advantages of biotechnology in paper production.

2 (a) Discuss the **advantages** of biotechnology in the production of paper and board. (4)

Biotechnology in paper and board is changing the genetic make-up of the trees used. The advantages are; trees can be resistant to insect/disease, which results in higher quality paper. Trees can have less lignin, therefore a reduction in the chemicals needed to break down the trees, which has environmental benefits. Trees can grow quicker so there is a sustainable supply for a manufacturer.

- 4 m - Resistant
- Less lignin
- Sustainable
(4)



ResultsPlus Examiner Comments

A clear and succinct answer that actually has more than four points outlined.

Four valid points have been made: Insect resistant, higher quality paper, less lignin, reduction in chemicals and trees growing quicker gain the marks here but only four count.



ResultsPlus Examiner Tip

The small plan of what the candidate wishes to include in the top right hand corner appears to have helped focus the answer without going off the point.

This response shows how a candidate can miss the point of the question.

Trees will still need to be cut down to get the wood for the paper.

At this level candidates should realise this and move forward to explain the biotechnological improvements that will help the paper and board industry.

2 (a) Discuss the **advantages** of biotechnology in the production of paper and board.

(4)

The advantages of using biotechnology in the production of paper and board is that it means less trees are cut down in order to produce paper and board which is good because it will mean less carbon dioxide and other greenhouse gases that will pollute the environment and be the most probable cause of global warming.



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Examiner Comments

It is unnecessary to repeat the question as this candidate has done to start the response. Unfortunately there was nothing in this response that could gain any marks.



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Examiner Tip

In any discuss type question it is important to construct sentence for the answer and not use single word answers.

Question 2 (b)

Most candidates achieved half marks or better here. They appeared to be well versed about the environmental impact of deforestation but a significant number were more concerned about the social impact on communities and the way places would look after deforestation.

Candidates wasted time and writing space by overly discussing a specific topic rather than identifying a range of points. An amount of 'moralising' and 'politicising' was evident in a number of cases. The question clearly required an 'outline' of the issues, not an in-depth, overly narrow debate. The high scorers were those who provided at least 6 clear, yet related, significant points. A well drafted essay style response which is what is expected for an outline question. Points are clearly made and in sufficient depth.

The candidate has not focused on one or two points in great depth.

(b) An important feature of timber production is sustainable forest management.

Outline the environmental impact that is caused by deforestation.

(6)

Deforestation is very hazardous to the environment - it reduces the amount of oxygen being released into the environment therefore increasing greenhouse gases. The amount of vehicles used to cut down trees also increases the amount of carbon dioxide in the air and carbon monoxide in the atmosphere. The amount of wildlife is also reduced. The production of roads to forests cuts down ground-water in the soil meaning the trees will find it harder to grow. However if responsibly deforested new trees can be planted - renewing the eco-system.

(Total for Question 2 = 10 marks)



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Examiner Comments

5 marks awarded for this response: reduction of oxygen in atmosphere, increase in greenhouse gases, logging industry causes pollution, decrease in wildlife, loss of nutrients in soil.



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Examiner Tip

Candidates should avoid cramming in sentences. This example is ok but there have been cases of squeezing in two lines of their writing between the dotted lines given making it extremely difficult to read.

The discussion in paragraph two on people and the final paragraph on species counted as the same marking point. Because of this the candidate only achieved three marks.

(b) An important feature of timber production is sustainable forest management.

Outline the environmental impact that is caused by deforestation.

(6)

Deforestation can have an effect on a range of areas:

There will be a loss of livelihood from people and tribes who use the forest to live in.

There will be a global impact from the deforestation such as global warming from destroying the trees and releasing Carbon Dioxide.

There will be more soil erosion since the trees helped to lock and secure the ground in place.

There will be a decrease in the numbers of species since there won't be a place for them to live.

(Total for Question 2 = 10 marks)



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Examiner Comments

3 marks in this response: global warming, soil erosion, species reduction, last line of response.



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Examiner Tip

It will be repeated many times over but a short period of time spent at the start of a question doing a brief plan of what to write about would help candidates achieve more marks.

Look at the number of marks for the question and this will indicate how many points examiners are looking for.

Question 3 (a)

Generally well answered and points across the mark scheme used. Some failed to gain marks because their points were poorly expressed or by writing far too much detail on one particular point. Most candidates gained good marks but many displayed a lack of understanding about coal stating things like – “as a natural product no harmful emissions are given off”. Many stated that there were no environmental consequences of using coal not realising the difficulty and affect both deep mining and opencast mining have on the environment. Some candidates thought electricity was extracted from the coal showing little understanding of the production of electricity.

The first sentence is concise and gives a valid response.

However the second paragraph is the opposite. The only point that can be taken from this is that coal can produce a lot of energy. Again some pre planning may help clarify the thinking.

sustainable future.

(a) Discuss the **advantages** of using coal as a source of energy. (5)

At the moment, there is a lot of coal around so it is readily available.

Coal burns well and high temperatures can be sustained over a long period of time, this helps with energy production because the heat produced with it produces steam which drives the turbines.

A lot of energy can be produced from coal because it burns slowly.

Coal is a cheap source of energy.



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Examiner Comments

Two marks have been awarded for this response: lot of coal around = large quantities of coal, lots of energy (from 2nd paragraph).



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Examiner Tip

The final sentence is a common response to many questions in D&T papers. Cheap is not acceptable by itself, it must be compared to something else. In this question cheap compared to some other sources of energy such as solar would be acceptable.

A clear and well presented answer. The answers give not only a what but also a why. For example a stable source of energy compared to solar power.

sustainable future.

(a) Discuss the **advantages** of using coal as a source of energy.

(5)

Coal is a very efficient source of energy, when it is burnt it creates a very stable source of energy which is not reliant on any other factors e.g. solar power NEEDS sun. It is also very widespreadly used which means no set up costs are required as coal burning systems are already in place. ~~As~~ As a result of its widespread use, coal is cost effective therefore a relatively cheap and reliable source of energy.



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Examiner Comments

There are four marks awarded for this response: stable source of energy, coal not dependent on weather, widespread use = infrastructure already available, cost effective.



ResultsPlus

Examiner Tip

In questions using outline in the stem a statement is often not enough, a justification should also be included.

Question 3 (b)

Candidates did respond quite well to this question but marginally less well in comparison with 3(a).

There was some confusion about AC/DC conversion and storage of electrical power,

Popular correct responses were: weather/reliability; back-up system; low power source; expensive; maintenance; eyesore; large area needed. Some failed to give five satisfactory points, instead focusing heavily on reasons why the sun is not a reliable source of energy, e.g. weather conditions/night time. Others spent time writing about other comparative energy sources, e.g. nuclear, tidal/wave and wind.

Each point made gives a justification in a clear and concise way. For example expensive by itself would not be enough, the addition of to install gives a reason for the expense.

(b) Discuss the **disadvantages** of using solar power as a source of energy.

(5)

A disadvantage for solar power is that it is expensive to have the solar panels installed. This therefore takes time for the energy to gather from the solar panels. The solar power can only work when there is sunshine so wouldn't work in the winter. Some people may also not like the look of these on their houses etc. This would also take time for the solar panels to be fitted correctly. There would need to be a number of solar panels in one place to be able to ensure that they work efficiently.



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Examiner Comments

There are four marks awarded for this response: expensive to install, no sun no power, eyesore, number of panels required.



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Examiner Tip

It is not necessary to go into great depth with the justification; just a pointer is usually enough.

Question 3 (c)

This question was answered with varying degrees of success. Most only gave enough information here to achieve 1 mark. Many were clear about the reduction in use of fossil fuel or the targets that had been set and some referred to the increase in renewable power but the knowledge didn't seem overly strong. Those who gained marks discussed reducing dependency on fossil fuel, using nuclear power and emissions.

Kyoto protocol was included by some with confused targets and percentages.

This was a good response clearly outlining the role of NFFO giving two areas that the organisation is promoting.

(c) Outline the role of the Non-Fossil Fuel Obligations (NFFO) in United Kingdom energy planning.

(2)

This is a plan where the government are attempting to promote the use of eco friendly products and trying to slow the rate that we, as a country, are using fossil fuels. Funding towards eco friendly products.

(Total for Question 3 = 12 marks)



ResultsPlus Examiner Comments

There are two marks awarded for this response: government involvement, promote eco friendly = renewable energy projects.



ResultsPlus Examiner Tip

This question was a clear case of candidates who understood the role gave very concise answers. Those who did not wrote a considerable amount in the hopes that something might be worth a mark. This can waste a lot of time for the candidate.

This response has been included to show how some candidates try to squeeze in an answer in the space provided.

Fortunately in this case the writing is easily readable. Unfortunately many have hand writing that is difficult to read and when squeezed in it can be very hard to decipher.

nuclear

(c) Outline the role of the Non-Fossil Fuel Obligations (NFFO) in United Kingdom energy planning. (2)

The role of the non-fossil fuel obligations, basically encourages companies in England and Wales to use nuclear or renewable ~~renewable~~ sources of energy rather than using other environmentally harmful non-renewable sources such as fossil ~~fuel~~ fuels. It plays a large role in helping to hinder the effects of global warming

(Total for Question 3 = 12 marks)



ResultsPlus
Examiner Comments

There are two marks awarded for this response: encourage use of renewable energy, reduce fossil fuel dependence.



ResultsPlus
Examiner Tip

Do not squeeze the writing in like this.

Question 4 (a)

Lots of marks were lost here because they did not focus on the effect on employment and when they did it was too vague, i.e. jobs lost. Those who were more specific tended to only give enough points to gain 2 marks.

There was confusion regarding low skill/low paid/low class.

A small number of candidates believed there would be an increase in low skill jobs and reduction in high skill jobs. Lots of candidates discussed the maintenance of machines.

Many just said there would be job losses without clarifying who would be losing jobs. Specific answers are required. A number of candidates wrote about computer integrated manufacture generally rather than the effect on employment.

Although the candidate has identified that employment would drop there is no follow up to say who would suffer.

The response is focused on what the machines can do rather than the affect upon employment.

(a) Outline the impact on employment of computer integrated manufacturing (CIM) systems in manufacturing industries.

(3)

Employment would drop in a company with a CIM system because there ^{are} very little labour costs on the manufacturing side. Because all of the ~~machine~~ machines are connected on a network this means that the actual manufacturing is all done by machines because they can do it faster than a human can.



ResultsPlus
Examiner Comments

No marks awarded for this response.



ResultsPlus
Examiner Tip

Read the question carefully. This response has missed the main point of the question.

This response shows the full affect of identifying a point and then developing it.

More skilled workers bought in gained a mark by identifying who, to operate and maintain computers etc was worth the third mark.

(a) Outline the impact on employment of computer integrated manufacturing (CIM) systems in manufacturing industries.

(3)

CIM removes less skilled workers because their job can be done by a computer that will cost less than employing them. At the same time more skilled workers are brought in to operate and maintain the computers and machines. While some people end up unemployed, others get employed.



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Examiner Comments

This response was awarded 3 marks.



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Examiner Tip

This answer shows that a concise answer can get the marks. Far too many responses generally show how unsure candidates are and they need to write about everything related about a topic whether it actually answers the question or not.

Question 4 (b)

This was poorly answered by a sizeable number of candidates. Many were in the mid mark range, but only a minority achieved highly. Candidates displayed a good understanding of JIT describing in detail how JIT is used within a factory. Quite a number spent fruitless time writing in much more detail about JIT and other related manufacturing process/styles, e.g. CIM. Most, though, addressed the question correctly and favourite points made concerned ordering/stock levels/storage space/customer demand/ reducing waste/reduces costs/no fat/no stockpiling/no over production/no warehousing/pull/materials ordered when customer orders are in.

A very wordy response that repeats itself on many occasions. Some points raised do not explain how the lean manufacturing is achieved and others are not valid.

Less time spent in storage is too vague. As much product produced as is needed - how is this decided. More depth need for many statements made in this response.

*(b) Discuss how the just-in-time (JIT) system is used to achieve lean manufacturing in industry.

(6)

The JIT system is used to create the least amount of waste time when producing a product. This contributes greatly to lean manufacturing as it reduces the time between conception and manufacture of the product meaning there will only be the exact amount of raw materials needed with no waste, the raw materials will spend less time in storage - costing less money, there will only be as much product produced as is needed - meaning less waste. There will also be fewer workers manufacturing the product meaning it will cost less

(Total for Question 4 = 9 marks)



ResultsPlus Examiner Comments

There are two marks awarded for this response: reduction of waste, reduced lead time (lines 5&6).



ResultsPlus Examiner Tip

A plan of what to include would take very little time to produce. Six possible marks available so six points needed.

This is a really good answer which covers more points than needed.

* (b) Discuss how the just-in-time (JIT) system is used to achieve lean manufacturing in industry.

(6)

J.I.T is used to achieve a pull process in manufacturing. It involves getting a supply on raw materials only when they are needed, which is notified through a system. Then they go through the production process and produce the amount of product needed so that the company doesn't need to pay for the stocking of any supplies. It results in a much more efficient workflow as they only produce the amount needed. It also means that the workforce is only producing the quantities needed and not producing too much. It results in an effective lean manufacturing system that has 'little excess fat' which means there is no storage, therefore reducing costs and a much efficient workflow.

(Total for Question 4 = 9 marks)



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Examiner Comments

There are six marks awarded for this response: pull process, supply raw materials only when they are needed, notify through a system = communication, no need stocking of supplies, more efficient workflow, only produce amount needed, little excess fat, no storage.



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Examiner Tip

A carefully thought out and well presented response.

Question 5 (a)

Many answered this question in detail and gained the full 3 marks.

Many really only focused on one point in their answers, writing more than was necessary about it without looking for three distinct points.

Marks were also lost because they just reiterated the same point over and over in different words, i.e. safe, security, cannot be intercepted or described why EDI is cost/time efficient in several different ways through their answer.

This response is carefully thought out and presented in bullet form. This can be a very good way of answering the questions with a lot of marks. Three marks available and three points given. Had point one included saving the company money or being more efficient then a mark was available.

The final point needed the addition of very large file for the mark.

5 The introduction of information and communication technology (ICT) has had considerable benefits for industrial and commercial practices.

(a) Discuss the **advantages** of using Electronic Data Interchange (EDI) for transmitting data between companies.

(3)

- Instant messaging and data transfer between different companies and workers cutting traveling.
- Most programs are global so designs and ideas can be shared with experts.
- The final design can be sent to factories with word "doc"s saying in detail of what to do. Good for international business.



ResultsPlus
Examiner Comments

All these points are common to email & not specific to EDI hence no marks awarded because there was not enough depth to the answers given.



ResultsPlus
Examiner Tip

Make sure the response actually focuses on what the question is asking for.

Whilst some of these responses could also be said about email, the responses have been sufficiently expanded to warrant marks being awarded.

5 The introduction of information and communication technology (ICT) has had considerable benefits for industrial and commercial practices.

(a) Discuss the **advantages** of using Electronic Data Interchange (EDI) for transmitting data between companies.

(3)

The advantages of using EDI are that it is time efficient against using the post for example, it is very quick to send information over the computer, another is that you can send a large amount of data at once meaning less hassle of sending lots of short packets of data and lastly it is cheap because you aren't having to pay for shipping or post because its over the computer.



ResultsPlus Examiner Comments

There are three marks awarded for this response: efficient, large amounts of data can be sent, shipping or post = reduced handling costs.



ResultsPlus Examiner Tip

Ensure that all answers are full and complete.

Question 5 (b)

A significant number of candidates appeared to have little idea of rapid prototyping. Often answers were quite vague, many seemed to guess the answer and achieved 2 marks for CAD and something about layers....

There were many confused answers which gave points for several systems. Stereo lithography attracted the best responses, but even here, few full marks. A good number of candidates were in the 3 – 5 mark region.

This question allowed candidates to select which process they wanted to describe. Stereolithography was the most popular method.

(b) Rapid prototyping (RPT) is used in the development of new products.

Describe how a prototype would be made using **one** of the following rapid prototyping processes:

- Laser Object Modelling (LOM)
- Stereolithography
- Solid ground curing
- Selective Laser Sintering (SLS)

(5)

Chosen process Stereolithography

The CAD drawing is sent to the RPT machine which then breaks it into thousands of layers at 0.125 mm thick. This data is then transferred to the machine's laser and resin bed controls. It begins with the bottom layer of the model skinning the laser to harden the resin. The resin drops down so the next layer can be formed on top of it. This process continues until a completed model is produced. Once finished the model needs to be cleaned and hardened, it is first put into an acidic bath which erodes all the unhardened resin leaving just the model. This is then placed in a UV oven to completely harden the resin and finish the process.

(Total for Question 5 = 8 marks)



ResultsPlus Examiner Comments

A full and complete answer to this question showing a sound understanding of this process.



ResultsPlus Examiner Tip

This question again could best be answered in bullet point fashion.

This response shows a very limited knowledge of the topic. Many responses were similar to this important topic.

(b) Rapid prototyping (RPT) is used in the development of new products.

Describe how a prototype would be made using **one** of the following rapid prototyping processes:

- Laser Object Modelling (LOM)
- Stereolithography
- Solid ground curing
- Selective Laser Sintering (SLS)

(5)

Chosen process Stereolithography

Stereolithography is a way of quickly producing 3D models of products by adding layers of a material over each other, cut to shape. The process itself is slow, however in groups, it is far more efficient than traditional methods and enables greater quality control. It uses a CAD/CAM system so it creates the model using a digital design created using specialised design software. These prototypes will provide visual information for quick analysis.

(Total for Question 5 = 8 marks)



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Examiner Comments

There are two marks awarded for this response: by adding layers = layer by layer, CAD/CAM system.



ResultsPlus
Examiner Tip

It is always worth trying to answer the question. Many candidates left questions unanswered and so could not score any marks. Although knowledge is vague some marks have been gained.

Always have a go at answering a question.

Question 6 (a)

In the main a good understanding of the two design movements was shown by the candidates. Most were able to correctly provide 4 appropriate responses for their selected design movement. A notable minority confused the 2 movements giving wholly mixed up responses which included characteristics of both Art Nouveau and Art Deco.

Some did not gain marks by describing characters such as Mackintosh and Gray.

A confused answer to this question. In this situation examiners are instructed to pick out the topic that gives the candidate the best mark.

(a) Outline the main characteristics of **one** of the following design movements:

- Art Deco
- Art Nouveau

(4)

Chosen design movement ~~art nouveau~~ art deco

~~art deco was a rebellion again~~ In the period of art deco new materials were starting to be used like steel etc, these were very harsh materials - the style of art deco was to put swirly, flowery patterns onto objects, using machinery - the shapes would still be basic - however they would have a pretty pattern engraved into the surface as a design feature. Usually swirly patterns.



ResultsPlus Examiner Comments

One mark awarded for this response: using machinery. Much of this answer is art nouveau not deco. However, using machinery is relevant to art deco.



ResultsPlus Examiner Tip

When offered a choice of topics within a question, make sure the responses only deal with one of the topics.

This response gives four valid points on Art Nouveau.

(a) Outline the main characteristics of **one** of the following design movements:

- Art Deco
- Art Nouveau

(4)

Chosen design movement Art Nouveau

Art Nouveau was influenced by nature and often featured languid lines and stylised flowers. It was also known as 'feminine art' as women were often featured in design with long flowing hair. Finally art Nouveau was influenced by other cultures, especially Japanese grid structures as ~~the~~ ^{the vertical lines} allowed products height.



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Examiner Comments

This response gained four marks: Nature, Languid lines Japanese grid structures, Stylised flowers.

Question 6 (b)

A considerable number of candidates failed to even attempt this question. Another large group wrote in such generic terms showing a clear lack of knowledge of Loewy that they too failed to gain many marks. Those who attempted the question

gained marks for mentioning streamlining/teardrop shape/a range of items/vehicles (trains/cars)/aerodynamics/reducing drag/increase speed /the father of modern industrial design.

A well constructed and presented answer. It covers five points, hence gaining full marks. The candidate has obviously studied this topic.

(b) Discuss the ways in which the work of Raymond Loewy has contributed to modern industrial design.

(5)

Raymond Loewy introduced a streamlined, more aerodynamic concept of how locomotives and transport should be shaped to increase their speed & aesthetic. He used the ideas of futurism, and often a teardrop shape to improve the functionality of cars, trains, buses, bikes and other vehicles. His ideas influenced the design of transportation and these concepts are still applied to transport today. As a result, transport is safer, faster and new concepts are still being manufactured. ~~The~~ Aeroplanes are possible to build larger because they are aerodynamic and compact.

(Total for Question 6 = 9 marks)



ResultsPlus

Examiner Comments

There are five marks awarded for this response: streamlined, more aerodynamic concept to transport; increase speed; aesthetic (two points in the same sentence); used teardrop shape; concepts are still applied to transport today.



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Examiner Tip

Again planning before answering the question can help achieve more marks.

This candidate has shown an understanding of the topic but has focused the response to include five points. Initial planning may well help in this subject.

(b) Discuss the ways in which the work of Raymond Loewy has contributed to modern industrial design.

(5)

Loewy has allowed companies to see that streamlining can improve a machine's performance, mainly with cars and other motorised machines that need to get places quickly. He also promoted the use of chrome to show the quality of a product and has now been adapted with the Retro theme of contemporary designs like the famous Smeg fridge. Having this streamlining has meant that cars, trains and other means of transport can be just faster than their predecessors. Also having these smoothed, curved designed designs looked sexy and is still used in the majority of today's sports cars.

(Total for Question 6 = 9 marks)



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Examiner Comments

There are three marks awarded for this response: streamlining improves machine performance (efficiency), mainly with cars & other motorised machines (broad range of items), looked very sexy (aesthetics).



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Examiner Tip

Focus the responses to ensure that if five marks are allocated then five points are made.

Question 7 (a)

Candidates completed this well. Wind was very often used instead of air. Teardrop shape was frequently stated but many only achieved one mark here as they made a statement that was not justified. Quite a number discussed impact on speed

A lot of effort was wasted by candidates rewording of question the discussing energy efficiency without actually answering the question.

This response shows a complete answer with a statement and a justification gaining both marks.

(a) Explain **one** reason why the streamlining of vehicles will make them more energy efficient. (2)

The air flow across the vehicle is smoother and therefore less energy is used to ~~make~~ make the vehicle move because there is less drag against the vehicle.



ResultsPlus Examiner Comments

There are two marks for this response: air flow across vehicle is smoother, less drag against the vehicle.



ResultsPlus Examiner Tip

With explain questions there must be a relevant point made and this point must be justified fully for both marks.

Two unrelated statements will only gain one mark.

An example of a mistake made by many candidates in various parts of the paper. The rewording of a question may help to focus the candidate but it does waste time.

(a) Explain **one** reason why the streamlining of vehicles will make them more energy efficient.

(2)

The streamlining of a vehicle will make them more energy efficient, due to the way in which it has been designed. By using streamlining it means that less energy is needed to be used.



ResultsPlus
Examiner Comments

There is nothing in this response, just a rehash of the question.



ResultsPlus
Examiner Tip

Do not waste time just restating the question with the words presented in a different order. It does not answer the question.

Question 7 (b)

This was a well answered, especially by candidates who read the question carefully and considered both form and function.

Many candidates achieved highly. They were able to identify with the vehicles and make appropriate form and function based observations. The vast majority provided as required, well balanced and focused responses. This response could cause problems. At the bottom of the response there appears to be some further work. Fortunately, the candidate had achieved full marks before reaching this section. If the candidate was still looking for marks then the whole script would have to be sent out for a full inspection.

(b) Figure 1 and Figure 2 below show two different vehicles.



Figure 1



Figure 2

Using the two examples in Figure 1 and Figure 2, evaluate how the designers have considered form and function as part of their design criteria.

(6)

In Figure 1 I believe that function has been taken into consideration more than form because the car is the right height off the ground to be safe over bumps and it has got space on the back to store belongings, as well as being suitable for most terrains. Also the windows are in the correct position and height for the driver to be able to see out of. In Figure 2 however I believe that form has been focused on over function as the car is very low to the ground and so it could cause difficulties when approaching speed bumps. Also windows are not in the best positions for the driver to see out of and the back of the car has no space for any belongings or even passengers and if it rained

(Total for Question 7 = 8 marks)



ResultsPlus Examiner Comments

There are six marks awarded for this response: Fig 1: function more than form, height off ground, space on the back to store things. Fig 2: form over function, very low to the ground, no space for belongings.



ResultsPlus Examiner Tip

Candidates should keep their responses to the area given in the booklet.

This candidate has spent most of the response focusing very narrowly and failed to cover all the necessary points.

(b) Figure 1 and Figure 2 below show two different vehicles.



Figure 1



Figure 2

Using the two examples in Figure 1 and Figure 2, evaluate how the designers have considered form and function as part of their design criteria.

(6)

Figure 1 has considered form follows function as they have considered the way in which the vehicle works whereas Figure 2 has considered form over function as they have firstly considered the appearance of the vehicle. Figure 1 has considered ensuring that it is fit for purpose and they have worked the appearance around the key functions of the vehicle. Within Figure 2 they have considered how they wanted the vehicle to look and then put the key functions within the design. With reference to form figure 2 has considered this more but with reference to function figure 1 has considered this more. Figure 2 also hasn't considered the anthropometrics eg. the height of the consumer. They also haven't considered the functions eg. boot, doors etc

(Total for Question 7 = 8 marks)



ResultsPlus Examiner Comments

There are two marks awarded for this response: Figure 1: form follows function. Figure 2: form over function.



ResultsPlus Examiner Tip

Great care is needed in this type of question to ensure that a full range of points are covered.

Points should be equally spread between the two subjects.

Question 8

Generally well answered by candidates, most displayed a clear understanding of the advantages and disadvantages of robotic arms. They also wrote in a style suitable for evaluating the advantages and disadvantages of the subject.

Popular responses being, accuracy/no wages/speed/24-7 working/safety, heavy loads/setup costs/ maintenance/unemployment/malfunctions. However, very few mentioned suitability for both batch and long run production. Some did waste time writing about AI, to no good effect. The vast majority of candidates achieved 5 marks or better, with a good number getting 7 or 8 marks. This example shows a response using bullet points. Although eight points have been made only four warrant a mark. Some of the responses are of insufficient depth or fail to justify the point made.

*8 Evaluate, using both advantages and disadvantages, the use of robotic arms in manufacturing industries.

Time ran out ∴ ~~Not~~ Bullet points.

- Robotic arms can do things that humans can't ~~because they~~ ~~do~~ ~~to~~ ~~that~~ because they can be programmed to lift heavy weights etc.
- They replace humans which adds to unemployment which is not good.
- They cannot be controlled without a human programming plan.
- They speed up manufacturing because they're computerised.
- They can be part of a CIM system.
- When used on production lines, they're effective.
- Good for mass production but not batch or one-off because they're expensive.

(Total for Question 8 = 8 marks)

TOTAL FOR PAPER = 70 MARKS



ResultsPlus

Examiner Comments

Four marks awarded for this response:
Jobs humans cannot do,
Increased unemployment,
Need programming,
Good for mass production.



ResultsPlus

Examiner Tip

Use the bullet response but make sure that any point made is adequately developed.

A very full and reasoned discussion with both points for and against.

*8 Evaluate, using both advantages and disadvantages, the use of robotic arms in manufacturing industries.

The advantages of using robotic arms are that no-one is needed to operate them 24 hours a day and also they can run for 24 hours a day every day without needing breaks. This will save the ~~same~~ company a lot of time and money, because there will be no ~~to~~ wasted time if it works constantly and will save money, because it doesn't need to be paid to work, ~~and~~ ^{also} will never need paid time off like human workers would. A disadvantage of using robotic arms is that they would cost a lot to ~~buy~~ ^{also} buy and install ^{the first} ~~in~~ ⁱⁿ the place. ~~Also~~ There is ^{also} the issue that they could break. If they break, highly skilled workers would have to be paid to fix them and money may even need to be spent on ~~a~~ replacement parts, or even to maybe replace the whole robot. Another disadvantage is that workers would be needed to check up on the robots occasionally, to check they are working ~~as~~ ^{also} as they should be. ~~And~~ Workers would ~~also~~ ^{also} be needed to reprogram the robots ^{robots} if they had to change their ['] job ~~method~~. This means that those workers would most likely have to be trained, meaning extra costs for the company to train them.

(Total for Question 8 = 8 marks)

TOTAL FOR PAPER = 70 MARKS



ResultsPlus Examiner Comments

Eight marks have been awarded for this response: run for 24 hours = 24/7, cost a lot to buy, cost a lot to install, highly skilled workers would have to be paid to fix them, reprogramme the robots, robots do not need to be paid, saves time and money, could break down.



ResultsPlus Examiner Tip

In any evaluation question points both for and against the topic must be put forward to access full marks.

Summary

Key points to take into consideration when preparing candidates for the exam are as follows:

Avoid labouring the point.

There was a tendency to repeat in different forms and phrasing the same information.

Do not waste time rewriting the question in a different form as part of the answer. As a general rule candidates should work on the principle of 1 mark per point. If the question is worth 6 marks then there should be six clearly defined and different points outlined in a sentence.

The use of bullet points can greatly help candidates to marshal their thoughts and ideas.

Candidates should try to give a point (what) followed by a reason/justification (the why or how).

Candidates should try to fit the answer in the space provided. If they go outside this space it may mean that they are not answering relevantly.

Do not put answers in other parts of the booklet. If it does not fit in the space available then go to an additional sheet.

Read the question carefully and then highlight the key words. This year many candidates misread or misinterpreted the question and gave answers that did not pertain to the question.

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